Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-07-D-3220
CTO NO. 0002

FINAL

WORK PLAN

August 18, 2008

TIME-CRITICAL REMOVAL ACTION FOR THE METHANE SOURCE AREA AT IR-07 PARCEL B, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

DCN: SEST-3220-0002-0017

DEPARTMENT OF THE NAVY
BASE REALIGNMENT AND CLOSURE
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AUG 18 2008

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Dear BCT members:

Enclosure (1) is the Final Work Plan for the Time Critical Removal Action for the Methane Source Area at IR-07, Parcel B. Thank you for your review.

If you should you have any concerns with this matter, please contact Keith Forman at (619) 532-0913 or Lara Urizar at (619) 532-0960.

Sincerely,

KEITH FORMAN
BRAC Environmental Coordinator
By direction of the Director

Enclosure: 1. Final Work Plan for the Time Critical Removal Action for the Methane Source Area at IR-07, August 18, 2008.

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DCN: SEST-3220-0002-0017

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ABBREVIATIONS AND ACRONYMS

µg/L	micrograms per liter
bgs	below ground surface
BCT	base closure team
BRAC	Base Realignment and Closure
CSO	Caretaker Site Office
CTO	Contract Task Order
DON	Department of the Navy
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
HPS	Hunters Point Shipyard
IR	Installation Restoration
LLRW	low-level radioactive waste
NAVFAC SW	Naval Facilities Engineering Command, Southwest
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RASO	Radiological Affairs Support Office
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
RWP	Radiation Work Permit
SAP	Sampling and Analysis Plan
SES-TECH	Sealaska Environmental Services, LLC and Tetra Tech EC, Inc.
SVOC	semivolatile organic compound
TCRA	time-critical removal action
TPH	total petroleum hydrocarbons
TtEC	Tetra Tech EC, Inc.
TtEM	Tetra Tech EM, Inc.
VOC	volatile organic compound

1.0 INTRODUCTION

This Work Plan describes the approach and methods to be used during a time-critical removal action (TCRA) of methane in soil gas and its source material at Installation Restoration (IR) Site 07 (IR-07) in Parcel B at Hunters Point Shipyard (HPS), San Francisco, California. The work will be performed by SES-TECH, a joint venture between Sealaska Environmental Services, LLC and Tetra Tech EC, Inc. (TtEC) under the Naval Facilities Engineering Command, Southwest (NAVFAC SW) Small Business Performance-Based Environmental Multiple Award Contract No. N62473-07-D-3220, Contract Task Order (CTO) -0002.

1.1 OBJECTIVES AND SCOPE OF WORK

The primary objective of this TCRA is to remove methane in soil gas and its source material from IR-07 to eliminate possible threats to public welfare now and in the future. The TCRA will confirm the presence of methane in soil gas, identify the source, refine the interpreted extent of the source, excavate the source area, and backfill the excavation to match existing grade. Visually contaminated soil and soil or debris identified as potential methane-producing material will be disposed of off-site. These activities will provide reasonable assurance that current and future threats of explosion due to methane gas in the subsurface shall be eliminated.

Specific data quality objectives for this project are discussed in the Sampling and Analysis Plan (SAP), included here as Appendix A. The main activities of this TCRA are as follows:

- Review historical and current information related to the removal action area.
- Collect and analyze soil gas samples to confirm methane levels in soil gas.
- Collect and analyze soil and groundwater samples to help evaluate the nature and extent of the methane source area.
- Excavate the methane source area.
- Segregate visually contaminated soil and methane source material.
- Create individual soil stockpiles for radiological and chemical waste characterization.
- Coordinate with other Navy contractors responsible for waste characterization, off-site disposal, and transportation.
- Coordinate with other Navy contractors responsible for radiological sampling, control, and surveying activities.
- Backfill the excavation.
- Install soil gas monitoring probes and perform initial monitoring to confirm that residual methane concentrations are not present in soil gas.
- Restore the site to match existing conditions.

- Prepare a Removal Action Closeout Report that documents the field methods, analytical results, data evaluation, conclusions, and recommendations.

The TCRA will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act. Oversight will be provided by the HPS Base Closure Team (BCT). The BCT comprises the Department of Navy (DON), U.S. Environmental Protection Agency (EPA), California Environmental Protection Agency Department of Toxic Substances Control, and the San Francisco Regional Water Quality Control Board. The DON is the lead agency responsible for the TCRA.

1.2 SITE LOCATION AND BACKGROUND

HPS is located on a long promontory in the southeastern part of San Francisco that extends east into San Francisco Bay (Figure 1-1). HPS encompasses 928 acres, of which 496 acres are land. The land portion of HPS was purchased by the DON in 1939 and leased to Bethlehem Steel Corporation. The DON took possession of the property at the start of World War II in 1941 and operated it as a shipbuilding, repair, and maintenance facility until 1974. HPS was deactivated in 1974. From 1976 to 1986, the DON leased HPS to Triple A Machine Shop, Inc. (Triple A), a private ship repair company. In 1986, Triple A ceased operations and the DON resumed occupancy.

HPS was originally divided into six parcels, Parcels A through F; Parcel A has been transferred to the San Francisco Redevelopment Agency and is no longer government property. Parcel E-2 was split from Parcel E to facilitate cleanup of the Industrial Landfill (Figure 1-2). In support of a potential early transfer, the Navy plans to further subdivide Parcel D into new areas preliminarily identified as Parcels D, D-2, G, and UC1.

IR-07 is located in the northeast corner of Parcel B at HPS. Site 18 is usually included in the IR-07 site discussions due to similar contamination and history. Collectively, the sites are referred to as IR-07/18 and comprise approximately 17 acres. The northwestern and southwestern boundaries are adjacent to the HPS property line, San Francisco Bay is on the northeast, and IR-07/18 is adjacent to the rest of Parcel B on the southeast.

Both IR-07/18 have been identified as radiologically impacted due to the potential presence or disposal of radiological material at the site. In order to ensure protection of the surrounding environment and onsite workers, radiological control practices shall be employed during all of the removal action activities.

1.3 PROJECT POINTS OF CONTACT

Key project contacts are listed below:

Organization	Contact	Project Title
Base Realignment and Closure (BRAC) Program Management Office West 1455 Frazee Road. Suite 900 San Diego, California 92108-4310	Melanie Kito, PE (619) 532-0787 Fax: (619) 532-0938	Lead Remedial Project Manager
Base Realignment and Closure (BRAC) Program Management Office West 1455 Frazee Road. Suite 900 San Diego, California 92108-4310	Lara Urizar, PG (619) 532-0960 Fax: (619) 532-0983	Remedial Project Manager
Radiological Affairs Support Office Building 1971 Naval Weapons Station Yorktown Yorktown, Virginia 23691-0260	Laurie Lowman (757) 877-4692	Radiological Site Manager
Base Realignment and Closure (BRAC) Program Management Office West 1455 Frazee Road, Suite 900 San Diego, California 92108-4310	Cindy Mafara (619) 532-0972 Fax: (619) 532-0995	Contract Officer (CO)
ROICC San Francisco Bay Area Engineering Field Activity West 2450 Saratoga Street, Suite 200 Alameda, California 94501-7545	Peter Stroganoff (510) 749-5941 (office) (510) 915-4928 (mobile)	Resident Officer in Charge of Construction (ROICC)
Caretaker Site Office HPS 410 Palm Avenue, Building 1, Suite 161 San Francisco, California 94130	Doug Delong (415) 743-4729	Field Team Leader
SES-TECH 1230 Columbia Street, Suite 540 San Diego, California 92101-8536	Ryan Ahlersmeyer, PG (619) 255-6173 (office) (619) 869-3027 (mobile)	SES-TECH Project Manager
Tetra Tech EC Site Office Hunters Point Shipyard 270 Nimitz Avenue, Building 270 San Francisco, California 94124	Bill Dougherty (415) 216-2731 (office) (415) 238-7006 (mobile)	Tetra Tech EC Project Manager for Base Wide Radiological Activities

1.4 PROJECT SCHEDULE

The current project schedule is presented as Figure 1-3.

1.5 WORK PLAN ORGANIZATION

This Work Plan is organized as follows:

- **Section 1.0: Introduction** – Provides an overview of the project, the objectives and scope of work, project points of contact, project schedule, and the Work Plan organization.

- **Section 2.0: Site Conditions and Background** – Presents the potential source area site histories, and a description of the geology and hydrogeology.
- **Section 3.0: Removal Action Activities** – Presents a summary of the activities to be performed as part of the planned removal action.
- **Section 4.0: Waste Management** – Provides practices and procedures to be followed for the types and quantities of waste expected to be generated.
- **Section 5.0: Reporting** – Describes documentation of activities presented in this Work Plan.
- **Section 6.0: References** – Includes a list of documents used to compile this report.
- **Appendix A** – Contains the SAP.
- **Appendix B** – Contains the Radiological Support Work Instruction.

2.0 SITE CONDITIONS AND BACKGROUND

This section reviews historical information regarding IR-07/18. Pertinent information from previous site operations, investigation results, geology and hydrogeology, and radiological designation of both areas are presented in this section.

2.1 SITE DESCRIPTION AND HISTORY

Parcel B occupies approximately 59 acres along the shoreline in the northwestern portion of HPS (Figure 1-2). The area occupied by IR-07/18 was among the last areas in Parcel B to be created by infilling of the bay. Comparisons of stereo pairs of black and white aerial photographs from 1935 and 1948 show no significant infilling or earthwork in that period (Tetra Tech, 2003). However, following 1948, the site was filled with soil, rock, and debris, with fill activities proceeding in a northeast to southwest progression. Review of a 1955 aerial photograph shows a narrow channel separating two distinct lobes of fill material. A 1963 aerial photograph shows that most of IR-07/18 had been filled with only a narrow channel remaining at the western perimeter of IR-18. A 1972 aerial photograph shows that the remaining channel had been filled and that the area was occupied by parking and storage areas. Remediation activities conducted at IR-07/18 from 1998 to 2001 revealed that the fill consisted of debris distributed sporadically throughout the subsurface and included wood, brick, asphalt, burned wood debris, tile, wallboard, concrete, wooden pilings or telephone poles, plastic, bottles, and deposits of sandblast grit (SulTech, 2004).

2.1.1 Installation Restoration Site 07/18

IR-07 was historically used by the DON in support of conventional (non-nuclear) submarine maintenance activities and included a painting area where sandblasting was used to remove paint from submarine structures, and an area identified as a disposal area for sandblast grit likely generated in the painting area. A 1987 investigation of soil and groundwater at IR-07 identified elevated concentrations of metals, volatile organic compound (VOCs), and semivolatile organic compounds (SVOCs) in soil and elevated concentrations of metals in groundwater (ChaduxTt, 2007).

Subsequent remedial investigations at IR-07 included soil sampling, geophysical surveys, test pit excavations, radiological surveys, and groundwater sampling. Samples collected during these investigations were analyzed for chromium VI, metals, oil and grease, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, SVOCs, total petroleum hydrocarbons (TPH)-diesel, TPH-motor oil, TPH-gasoline, and VOCs. Chemicals reported at concentrations above detection limits in soil included metals, oil and grease, PAHs, PCBs, TPH-motor oil, VOCs, and pesticides. Chemicals reported at concentrations above detection limits in groundwater included metals, VOCs, and TPH-motor oil (PRC et al., 1996).

A soil gas survey conducted at IR-07 in 2005 was designed to provide a 95 percent degree of certainty that a methane plume with a radius of 65 feet or greater would be detected (SES-TECH, 2005). Methane in soil gas was detected in a small area at concentrations as high as 17 percent by volume (Figure 2-1). The area of detection corresponds to a small crescent-shaped area of shoreline in a 1948 aerial photograph (Attachment 3). The sediment in this crescent-shaped "bay" is visibly darker than surrounding sediment. The boring log for IR07B032 notes black clayey sand from 16 to 24 feet below ground surface (bgs). Similarly, the boring log for IR07MW27A notes dark sandy clay present between 12 and 21 feet bgs (Attachment 2). Undifferentiated Upper Sands or Franciscan Formation bedrock is present below the fill at depths between 21 and 24 feet bgs based on these two logs. Dissolved oxygen and oxidation reduction potential measurements from well IR07MW27A indicate that reducing conditions necessary to produce methane are present, and the dark sediment may indicate the presence of methane-producing source material. Water quality parameters measured at IR07MW27A during the March 2008 sampling event included oxidation-reduction potential measurements at approximately -130 millivolts (CE2/Kleinfelder, 2008). Additional data will be collected as described in Section 3 to finalize the interpretation of the areal extent of the methane source area for this removal action.

IR-18 is located adjacent to IR-07, and their site history, investigation results, and geology and hydrology are similar. IR-18 was used as a waste oil disposal area by Triple A, who reportedly disposed of waste oil and other liquids on the ground. The remedial investigation at IR-18 included soil borings, geophysical surveys, test pit excavations, radiological surveys, and groundwater sampling. Samples collected during these investigations were analyzed for chromium VI, metals, oil and grease, PAHs, PCBs, pesticides, SVOCs, TPH-diesel, TPH-motor oil, TPH-gasoline, and VOCs. Chemicals reported above detection limits in soil included metals, oil and grease, PCBs, SVOCs, TPH-diesel, TPH-motor oil, TPH-gasoline, and VOCs. Chemicals reported above the detection limits in groundwater included metals, oil and grease, and TPH-motor oil (PRC et al., 1996).

A Record of Decision for Parcel B was finalized in 1997 (DON, 1997). The remedy selected for soil was excavation and off-site disposal. Between 1998 and 2001, over 100,000 cubic yards of contaminated soil was removed from all of Parcel B. Excavations ranged from 4 to 19 feet bgs at IR-07 and from 7 to 10 feet bgs at IR-18 (SulTech, 2004).

2.1.2 Radiological Designation

According to the Final Historical Radiological Assessment, Volume II (NAVSEA, 2004), IR-07 and IR-18 were potentially used for disposal of sandblast grit associated with decontamination of radiologically contaminated ships involved in atomic weapons testing. Therefore, both IR-07 and IR-18 were designated as radiologically impacted sites. Radionuclides of concern include radium-226, cesium-137, strontium-90, and plutonium-239. Specific information on the history

of decontamination of ships associated with atomic testing and radiological surveys that were conducted at IR-07/18 can be found in Section 6 and Appendix D of the Final Historical Radiological Assessment (NAVSEA, 2004).

2.2 SITE GEOLOGY AND HYDROGEOLOGY

The surface and near surface of IR-07/18 consist of fill materials containing serpentine bedrock, excavated Bay Mud, sands, gravels, construction debris, industrial debris, and localized sandblast waste (SulTech, 2004). The fill extends to approximately 50 feet bgs in some locations and exhibits a general thickening toward San Francisco Bay. Based on a review of boring logs in the methane source area, the fill is approximately 25 feet thick (Attachment 2). The fill is underlain by Undifferentiated Upper Sand, Bay Mud deposits, and serpentine bedrock (PRC et al., 1996).

Two groundwater aquifers have been identified in Parcel B: the A aquifer and the bedrock water-bearing zone. Depth to groundwater in the A aquifer in IR-07/18 ranges from near surface adjacent to San Francisco Bay, to approximately 18 feet bgs at the southwestern border of IR-18. Recent measurements at IR07MW27A in March 2008 indicated an approximate depth to water of 11 feet bgs (CE2/Kleinfelder, 2008). A tidally influenced zone approximately 150 feet wide has been identified in IR-07 adjacent to the bay (SulTech, 2004).

3.0 REMOVAL ACTION ACTIVITIES

This section describes the activities and procedures involved in preparation for, and field implementation of, the proposed TCRA. The planned activities include:

- Scheduling and attending a kickoff meeting with NAVFAC SW, Radiological Affairs Support Office (RASO), Resident Officer in Charge of Construction (ROICC), Caretaker Site Office (CSO), and the Navy's radiological and waste disposal contractors
- Coordinating with the Navy's radiological contractor and RASO to obtain an approved radiological work permit and radiation awareness training
- Utility clearance of proposed excavation area
- Mobilizing field personnel and subcontractors
- Pre-excavation soil gas sampling using temporary probes
- Pre-excavation groundwater sampling using temporary wells
- Pre-excavation continuous soil core sampling
- Excavating the methane source area and stockpile management
- Coordination with other Navy contractors responsible for waste characterization, off-site disposal, and transportation
- Excavation backfilling
- Installing post-excavation soil gas probes and initial sampling
- Equipment decontamination
- Site restoration and demobilization
- Confirmation soil gas sampling

These activities are described in the following subsections.

3.1 FIELDWORK PREPARATION

Preparatory activities will include appropriate notification and a kickoff meeting with NAVFAC SW, RASO, ROICC, CSO, and the Navy's radiological contractor and waste disposal contractors. The project team will receive site-specific training in health and safety and radiological awareness, a temporary field office will be established, and the proposed excavation area will be surveyed for underground utilities.

3.1.1 Radiation Work Permit

SES-TECH will coordinate with the Navy's radiological contractor (TtEC) to prepare a Radiation Work Permit (RWP) for RASO approval prior to the field mobilization. The RWP will be prepared and maintained by TtEC in accordance with the procedures described in the Basewide Radiological Work Plan Revision 1 (TtEC, 2007) and Appendix B of this Work Plan. SES-TECH will notify the Remedial Project Manager (RPM), RASO, ROICC, and the CSO about the nature of the anticipated work. All equipment, material, and personnel entering and leaving the radiologically controlled area will be subject to the requirements of the RWP, including screen-in and -out procedures. All radiological sampling, control, and survey practices to be implemented as part of this TCRA will be performed by TtEC, the Navy's radiological contractor, in coordination with SES-TECH.

3.1.2 Kickoff Meeting

At least 2 weeks prior to the start of the field activities at the site, a kickoff meeting will be held. The purpose of this meeting is to develop a mutual understanding of the field activities, radiological requirements, health and safety practices, Contractor Quality Control details, forms to be used, administration of on-site work, and schedule. SES-TECH will prepare minutes of the meeting for submittal to the DON. The following parties will be requested to attend: RPM, RASO Project Manager, ROICC, CSO, SES-TECH Project Manager, Site Superintendent/Quality Control (QC) Manager, Site Health and Safety Supervisor, and the Navy's radiological and waste disposal contractors.

3.1.3 Utility Clearance

Prior to intrusive activities, Underground Service Alert will be notified. Existing base utility drawings will also be reviewed and a site walk with the CSO and ROICC will be held to review the proposed excavation area and sampling locations. In addition, a subcontracted geophysical company using a variety of methods, including metal-locating techniques and ground-penetrating radar, will verify the location of underground utilities in the proposed removal action area.

3.2 MOBILIZATION

Mobilization activities will include site preparation, inspection and approval of the removal action work area by NAVFAC SW and RASO, movement of equipment and materials to the site, and arranging base access for field personnel. At least 2 weeks prior to mobilization, the appropriate DON personnel will be notified about the planned schedule for mobilization.

Upon receipt of authorizations, field personnel, required equipment, and materials will be mobilized to the site. All personnel will be required to attend a radiological awareness and safety training prior to working on site. The removal action excavation and soil stockpiling will be conducted within the former radiological screening yard used for the Parcel B storm water

and sanitary sewer removal. The area is secured with chain-link fence and a locking gate. The overall site layout, including locations of water storage tanks, the decontamination pad, sumps, and material storage areas, is included in Figure 3-1. Radiological warning signs and placards are in place. Stockpile liners and storm water berms are also in place. Prior to inspection, the following facilities will be set up: toilets, wash stations, a scan-in and scan-out station, and equipment storage containers.

As described in Appendix B, all incoming equipment and material will be subject to the following:

- Equipment and material will be radiologically surveyed for existing contamination levels prior to being placed into service.
- Surveys will consist of a 100 percent scan of accessible areas for alpha/beta contaminants. Swipes will be taken to ensure that no removable contaminants are present. Should any survey results exceed the contamination limits defined in Appendix B, the equipment will not be permitted for placement into service and will be returned to the shipment point of origin.

3.3 METHANE SOURCE AREA SAMPLING AND RATIONALE

A direct-push sampling rig will be used to collect soil samples and install soil gas monitoring probes and temporary groundwater monitoring wells. Soil, soil gas, and groundwater samples will be used to help characterize the methane source area before excavation. Permanent soil gas probes will be installed to monitor methane levels after the removal action excavation is completed.

The objectives of the soil and groundwater sampling are:

- Provide detailed information of the subsurface lithology and any waste mixed with the fill soil;
- Evaluate methane concentrations in groundwater to help identify source areas;
- Refine the extent of the excavation in order to minimize the amount of material requiring radiological screening and disposal; and
- Identify the depth of native material underlying the removal action boundary.

IR-07 as a whole is a fill area, with numerous excavations having been performed to a maximum depth of 10 ft bgs (SulTech. 2004). Initial, step-out, and confirmatory sampling results from remedial action excavations indicated a wide-spread contaminant distribution typical of a contaminated fill area. Many of the contaminants reported site-wide could be methanogenic, including those reported in areas adjacent to this TCRA. As described in Section 2.2.1, the

ubiquitous nature of contamination throughout IR-07, including potentially methanogenic constituents, makes definitive identification of the source material extremely difficult. Therefore, a phased approach to the TCRA shall be utilized wherein separate lines of evidence will be reviewed to achieve the objectives of the TCRA. The preliminary sampling included in this approach is proposed to refine the planned excavation details, gain information on the subsurface content, and perform limited waste characterization. Ultimately, the excavation will extend down to native material within the boundaries of the methane soil gas plume.

Additional information on soil and groundwater sample collection methods, sample handling, analyses, and quality assurance (QA)/QC is included in the SAP (Appendix A) and in the following subsections. All sampling and investigation activities described hereafter shall be subject to the requirements of the RWP and radiological support work instruction (Appendix B).

3.3.1 Soil Gas Probe Installation

Ten temporary soil gas probes will be installed to a depth of 3 feet bgs to confirm and refine the current (pre-excavation) extent of methane in soil gas. The information collected at these locations will be used to help refine the interpreted current extent of the methane source area.

The soil gas probes consist of an intake screen attached to an expendable probe tip. The probe will be connected to the surface via tubing connected to a hose barb at the top of the screen. Filter sand will be placed in the annular space across the screened interval, and a bentonite slurry seal will be placed above the filter material to ground surface. The tubing will be capped to seal the probe from the atmosphere. After the removal action excavation is backfilled, five permanent soil gas probes will be installed. Permanent soil gas probes will be constructed as described above, and will be finished with a traffic-rated cover set in concrete. Following installation, each of these probes will be sampled to confirm that methane is not present in the subsurface.

3.3.2 Soil Gas Measurements

At each location, the soil gas probe pressure will be measured using a Magnehelic® or equivalent vacuum/pressure gauge and recorded on a field data sheet. Measurement of the soil gas pressure is part of the standard procedure for field measurements of soil gas, although in this instance the pressure is likely insignificant as compared to atmospheric changes. Methane soil gas concentrations will be measured with a CES-LANDTEC GEM™ 2000 (GEM 2000) connected to the tubing for purging and measurement. Prior to recording the methane measurements, the soil gas probe will be purged using the GEM 2000 until at least three tip and tubing volumes have been removed. The purge and measurement rates are based on the internal pumping rate of the GEM 2000, which pumps about 500 cubic centimeters per minute. Measurements will be recorded on field log sheets once the soil gas readings have stabilized. These measurements will include the percent methane, percent carbon dioxide, percent oxygen, temperature, and

barometric pressure. Once the methane measurements are complete, the GEM 2000 will be detached from the tubing, and a photoionization detector (PID) will be attached to the tubing to measure total VOCs. Once the total VOC readings have stabilized, the measurement will be recorded on the field log sheet. The PID will then be removed and the probe tubing will be recapped. Worksheet 18 of Appendix A includes a detailed description of sampling protocol.

3.3.3 Confirmation Sampling and Leak Testing

Confirmation testing and leak detection will be performed on all locations. Soil gas samples will be collected in Summa canisters and analyzed for methane and VOCs. Prior to confirmation sampling, a tracer compound will be introduced to the exterior of the soil gas probe at the junction of the tubing and the bentonite seal. Leak test results will be analyzed as a component of VOC testing.

3.3.4 Soil Gas Monitoring Probe Decommissioning

The temporary soil gas probes installed for pre-excavation characterization will be excavated during the remedial action if they are installed within the excavation boundary. Probes installed outside the excavation boundary will be removed, and the probe holes will be tremie backfilled with cement-bentonite grout to the ground surface.

3.3.5 In Situ Soil and Groundwater Sampling

Immediately following the pre-excavation soil gas sampling activities, up to four soil borings will be installed to approximately 25 feet bgs to provide lithologic information and facilitate in situ groundwater sampling. This depth was selected based on a review of available boring logs and is the approximate depth to Bay Mud or native lithology below the fill material.

Continuous soil cores will be logged by a SES-TECH field geologist. Soil cores will be 1) visually inspected for potential chemical contamination; 2) field screened for methane and VOCs using the GEM 2000 and a PID; and 3) logged in accordance with the Unified Soil Classification System (American Society for Testing and Materials D2488-90) and Munsell, or equivalent, color designations. The soil cores will be inspected for potential methane-generating material such as wood, petroleum contamination, and other organic material. Selected soil samples will be analyzed for waste-characterization purposes. The results of these analyses will be reviewed for the presence of organic contaminants, potentially indicative of methane-generating material. Lithologic soil boring logs will be generated and approved under the supervision of a state of California professional geologist.

In situ groundwater sampling for dissolved methane will be performed at approximately 5-foot intervals (15, 20, and 25 feet bgs) in each of the four borings (12 samples total). In the event that one or more sources of methane is present in the saturated zone, subsurface conditions may result

in dissolved methane in groundwater. A variety of physical and chemical mechanisms may result in dispersion of the methane, resulting in transport to adjacent saturated and unsaturated zones. If released from solution, the methane will collect in the vadose zone as soil gas.

In the event that dissolved methane is detected, it is reasonable to assume that one or more sources are present below the associated sampling depth. The groundwater results will be plotted to identify the location and vertical horizon at which dissolved methane was detected. If dissolved methane is present in groundwater over the entire vertical extent of sampling, the results will be reviewed for the presence of a potential concentration gradient. The results of the soil, soil gas, and groundwater sampling, in combination with the lithologic observations, will all be reviewed and weighted equally when identifying the preliminary source of methane in soil gas. This assessment will be used to refine the planned extent and depth of excavation.

Trip blanks will accompany each sample cooler, and equipment blanks will be collected during each day of sampling when nondisposable sampling equipment is used. Additional information on QA/QC samples and descriptions of sample handling and analysis are included in the SAP. All samples and equipment shall be subject to the requirements of the RWP, as described in Section 3.1.1 and Appendix B of this Work Plan.

3.3.6 Borehole and Monitoring Well Decommissioning

Temporary groundwater monitoring well borings will be tremie-backfilled with cement-bentonite grout to the ground surface. As described in Subsection 3.3.4, the shallow temporary soil gas probes within the proposed excavation will be excavated, and those outside the excavation will be removed and the borings backfilled with cement-bentonite grout to the ground surface.

Groundwater monitoring wells within the excavation boundary will be destroyed by removing all material within the original borehole, including the casing, well screen, filter pack sand, and annular seal. The remaining borehole will be completely filled from the bottom of the borehole to the ground surface with bentonite or cement bentonite grout. An alternative well destruction method is to completely over-excavate the monitoring well. This method will completely remove the well materials specified above, and backfill will be according to the excavation plan.

3.4 EXCAVATION AND SOIL MANAGEMENT

The initial excavation boundary will be determined by the preliminary sampling, while the final boundary will depend on type, quantity, and location of material encountered in the hole. The excavation will comprise the vertical and horizontal extent of the methane source material to a maximum depth of 25 feet bgs or until native material (Bay Mud or bedrock) is reached. The boring logs for IR07B032 and IR07MW27A show that bedrock was encountered at 28 feet and 23 feet bgs, respectively, overlaid by a small amount of undifferentiated upper sands deposits

(Attachment 2). If the results of the preliminary sampling indicate the need to excavate beyond 20 feet bgs, an engineered excavation plan will be developed and approved by a registered professional engineer. Although unlikely, if native material is not identified during the preliminary sampling activities, the excavation plan shall be modified to extend the total depth as necessary to achieve the objectives. The excavation will be ramped on one side to provide heavy equipment access. It is anticipated that existing levels of methane in soil gas will escape from the soil matrix as the excavation commences. The farthest reaches of the excavation will be completed first. Once the excavation reaches the water table, a benched area will be constructed to dewater the waste before loading into trucks, as necessary. This method has proven effective at radiological and petroleum excavations in the past. Pumping groundwater and subsequent treatment are not planned. Based on past experience, it is anticipated that nearly vertical walls can be maintained during excavation. Waste will be removed to the final depth at the farthest reaches of the excavation first. The excavator will then back up the ramp and continue the excavation process. If excavation continues deeper than approximately 15 feet bgs, pea gravel or rock will be used as backfill against the sidewalls to increase sidewall stability.

Excavated material will be direct-loaded into dump trucks for transport to the appropriate secondary staging area. It is anticipated that the excavated material will consist of differing types of debris and soil, all of which shall be subject to the requirements of the RWP. As the excavation progresses, the material will be sorted based on its chemical and physical nature as determined by the preliminary sampling activities and visual or olfactory indications of gross chemical contamination. In addition, debris shall be sorted based on its physical nature, and the likelihood that the debris can be effectively surveyed and released for radiological constituents. Upon sorting, the material shall be transported to either the soil screening pads or the waste storage area (Figure 3-1) for subsequent radiological survey. Additionally, a low-level radiological waste (LLRW) storage area will be established for all material identified as radiological waste during the surveying activities. Material generated from the target area of excavation, exhibiting obvious staining or gross contamination, or containing material and debris other than soil shall also be segregated and transported directly to the waste storage area. Debris and material which can not be effectively radiologically surveyed and released will be transported directly to the LLRW storage area.

To minimize potential worker exposure to, and spread of, contamination during excavation, screening, and stockpiling, dust suppression measures will be implemented. Air monitoring for radiological constituents will be performed per the requirements of the RWP. Other chemicals of concern, such as PCBs, asbestos, and particulates, will be monitored as necessary for health and safety purposes to confirm the effectiveness of these measures per the Site Health and Safety Plan.

The excavation will be backfilled using a combination of staged material, clean soil currently available onsite, and stone or pea gravel. The site will be backfilled to original grade, and roller-compacted (or equivalent), as necessary to support site restoration.

3.5 SOIL STOCKPILE AND DEBRIS HANDLING PROCEDURES

Once the material has been transported to the appropriate secondary staging area (soil screening or waste storage), radiological surveys shall be conducted to ensure worker protection and perform a preliminary determination of non-LLRW and LLRW waste type. Secondary staging and screening activities will utilize the screening pads comprising radiological screening yard 1 (RSY-1), and constructed for use in the Parcel B storm and sanitary sewer removal activities.

Soil placed on the screening pads will be spread out in approximately 12-inch lifts, with each stockpile associated with one truckload of excavated material. As necessary, the material will be allowed to dewater before radiological surveys are performed. The surveys will be performed manually for beta/gamma emitters as described in Appendix B. Water from the dewatering/screening pads will be collected, characterized for chemical and radiological constituents, and properly disposed of. Following the survey, the material will be consolidated for subsequent use as backfill. Material identified as LLRW during screening activities will be collected, segregated, and stored in appropriate containers within the LLRW staging area for subsequent packaging and disposal under the direction of the DON LLRW Disposal Program.

Soil which has been taken to the waste storage area will be surveyed as described above, although the subsequent consolidation shall be in support of chemical waste characterization and offsite disposal. All other debris and material (not soil) will be radiologically surveyed and designated as LLRW or non-LLRW. LLRW will be taken to the LLRW storage area, while non-LLRW will be staged and characterized for subsequent offsite disposal.

Best management practices will be established to prevent run-off from the site affecting the bay during these activities. Soil stockpiles will be sprayed with a dust suppression product mixed with water. The Navy proposes to use a dust suppression product (Gorilla Snot™, or equivalent) that has been previously used at HPS and is considered highly effective.

3.6 TRAFFIC CONTROL

Traffic controls will be used to provide for the efficient completion of work activities in a safe working environment. Chain-link fencing is set up around the work area, and the site is not currently in use. Additional areas will be established within the larger boundary to support the secondary staging areas described in Section 3.4. Most work will take place within the fenced area. Soil and debris identified for offsite disposal, and has been radiologically released, will be transferred from the work area as necessary to facilitate transportation and disposal by another

Navy contractor. Traffic flow within the site boundary shall be maintained as presented in Figure 3-1. A flagman will be used to control traffic flow, if needed.

3.7 INVESTIGATION-DERIVED WASTE

Site investigation activities will generate personal protective equipment (PPE), decontamination fluids, purge water, soil samples, and wastewater. Waste will be sampled in accordance with the SAP (Appendix A) and will be handled in accordance with procedures described in Section 4.0 – Waste Management. In addition, all IDW will be subject to the requirements of the RWP and radiological support work instruction, both of which are developed in accordance with the requirements of the Basewide Radiological Work Plan (TtEC, 2007).

3.8 EQUIPMENT DECONTAMINATION

Decontamination of nondisposable equipment will be conducted between each investigation location and will consist of high-pressure washing with phosphate-free detergents followed by a potable water rinse. A more detailed discussion of decontamination procedures is presented in the SAP (Appendix A). Decontamination activities will be subject to the requirements of the RWP and radiological support work instruction, both of which are developed in accordance with the requirements of the Base Wide Radiological Work Plan (TtEC, 2007).

3.9 SITE SURVEY

Prior to sampling and excavation, the proposed sampling locations and resulting limits of the excavation will be surveyed (Figure 2-1). Each pre-excavation sampling location will be surveyed to an accuracy of 0.01 foot vertically and 0.1 foot horizontally and will be in accordance with the North American Vertical Datum 88 and the North American Datum 87, respectively. Results will be generated by the survey subcontractor and will be signed by a state of California-certified surveyor. The final excavation boundary and depth will also be surveyed.

3.10 DEMOBILIZATION

Demobilization will consist of decontamination and radiological release of all equipment used to conduct the investigation. SES-TECH will collect and dispose of all work materials including decontamination water and disposable equipment for which decontamination is inappropriate. Waste transport and manifestation will be coordinated with the ROICC.

4.0 WASTE MANAGEMENT

Solid waste may include chemical and mixed radiological waste. The majority of waste material will likely be soil and construction debris. Minor amounts of sandblast grit may be encountered. Any sandblast grit that is excavated will be segregated from other waste material and screened for radiological contamination. Minimal liquid waste will be generated from the planned field activities. Liquid waste will be limited to small quantities of decontamination water. Waste streams associated with field activities are categorized as follows:

- Wastewater, including decontamination fluids, fluids from equipment, and personnel decontamination
- Soil samples from continuous core sampling
- Non-hazardous solid waste, such as trash and used PPE

In addition, all waste, waste sampling, and associated processes will be subject to the requirements of the RWP and radiological support work instruction, both of which are developed in accordance with the requirements of the Base Wide Radiological Work Plan (TtEC, 2007).

4.1 LIQUID WASTE

Small volumes of wastewater generated from equipment and personal decontamination will be collected in Department of Transportation (DOT)-approved 55-gallon drums and labeled as "Investigation-Derived Decontamination Water – Pending Analysis." The drums will be temporarily staged within the secured work area.

4.2 SOLID WASTE

The majority of the solid waste excavated is expected to be soil and construction debris. Minor sandblast grit may be encountered. Soil and debris will be stockpiled and screened for radiological contamination as described in Section 3.5. If the solid waste radiological screening results are above cleanup levels, the material will be stored in waste bins. The bins will be transported from the work area to a secure bin storage area for further waste characterization. Characterization and disposal of mixed radiological waste will be conducted by the Navy's radiological waste disposal contractor. If the soil and debris can be demonstrated to be below radiological cleanup levels, it will be inspected for visual chemical contamination. If the solid waste appears oily or discolored by chemical contaminants, it will be stockpiled for waste characterization purposes. Disposal and characterization of solid waste will be conducted by the Navy's waste disposal contractor. Trucks transporting these non-radiological wastes will pass through the on-site portal monitor prior to exiting HPS.

4.3 USED PERSONAL PROTECTIVE EQUIPMENT

Used PPE will be stored in labeled, DOT-approved 55-gallon drums within the secured work area pending classification and appropriate disposal. SES-TECH will coordinate the disposal of PPE, which has been radiologically released, used by SES-TECH employees.

4.4 CONTAINER LABELING

Containers determined to be non-hazardous waste will be labeled accordingly, and a non-hazardous label will be completed and attached to each drum. The label will include the following:

- Name and address of the generator
- Description and origin of the contents
- Date of generation (date of first waste drop placed in the container)

If containers are determined to contain hazardous waste, they will immediately be labeled with a completed "Hazardous Waste" label that will include:

- EPA identification number of the generator
- Name and address of the generator
- EPA waste code
- DOT shipping name (prior to off-site shipment)
- Description of contents
- Accumulation start date (date first drop of waste placed in container)

An inventory of waste containers will be maintained. In addition, weekly inspections of container storage areas will be conducted and logged while wastes remain in these areas to ensure the integrity of the containers and secondary containment, to check for leaks or spills, and to ensure that labels and markings are in good condition.

4.5 OFF-SITE DISPOSAL, TRANSPORTATION, AND DOCUMENTATION

Radiological and mixed radiological waste disposal, transportation, and documentation will be coordinated under the DON LLRW Disposal Program.

Chemical waste disposal, transportation, and documentation will be coordinated under separate contract with the Navy. Waste characterization sampling will be conducted in accordance with applicable laws and regulations.

5.0 REPORTING

Once results from the removal action have been tabulated, a Removal Action Closeout Report will be prepared that describes the methods, summarizes and evaluates the data, and presents the conclusions and recommendations. The Removal Action Closeout Report will be reviewed and signed by a California-licensed Professional Geologist.

6.0 REFERENCES

CE2/Kleinfelder. 2008. "Hunters Point BGMP Project Portal" website. *http://www.ce2corporation.com/hp_portal*. June 30

DON (Department of the Navy). 1997. Hunters Point Shipyard, Parcel B, Final Record of Decision. October 7.

NAVSEA (Naval Sea Systems Command). 2004. Final Historical Radiological Assessment, Volume II. August 31.

PRC (PRC Environmental Management, Inc.), Harding Lawson Associates, Levine Fricke, and Uribe and Associates. 1996. Parcel B Remedial Investigation Draft Final Report, Hunters Point Shipyard, San Francisco, California. June 3.

SES-TECH. 2005. Final Soil Gas Technical Memorandum, IR Sites 07/18, Parcel B,. Hunters Point Shipyard, San Francisco, California. September 23, 2005.

SulTech. 2004. Draft Parcel B Construction Summary Report Addendum, Hunters Point Shipyard, San Francisco, California. September 8.

ChaduxTt. 2007. Final Technical Memorandum in Support of a ROD Amendment. December 12.

Tetra Tech. 2003. Final Technical Memorandum, Interpretation of Fill Conditions at Installation Restoration Sites 07 and 18, Parcel B, Hunters Point Shipyard, San Francisco, California. March 28.

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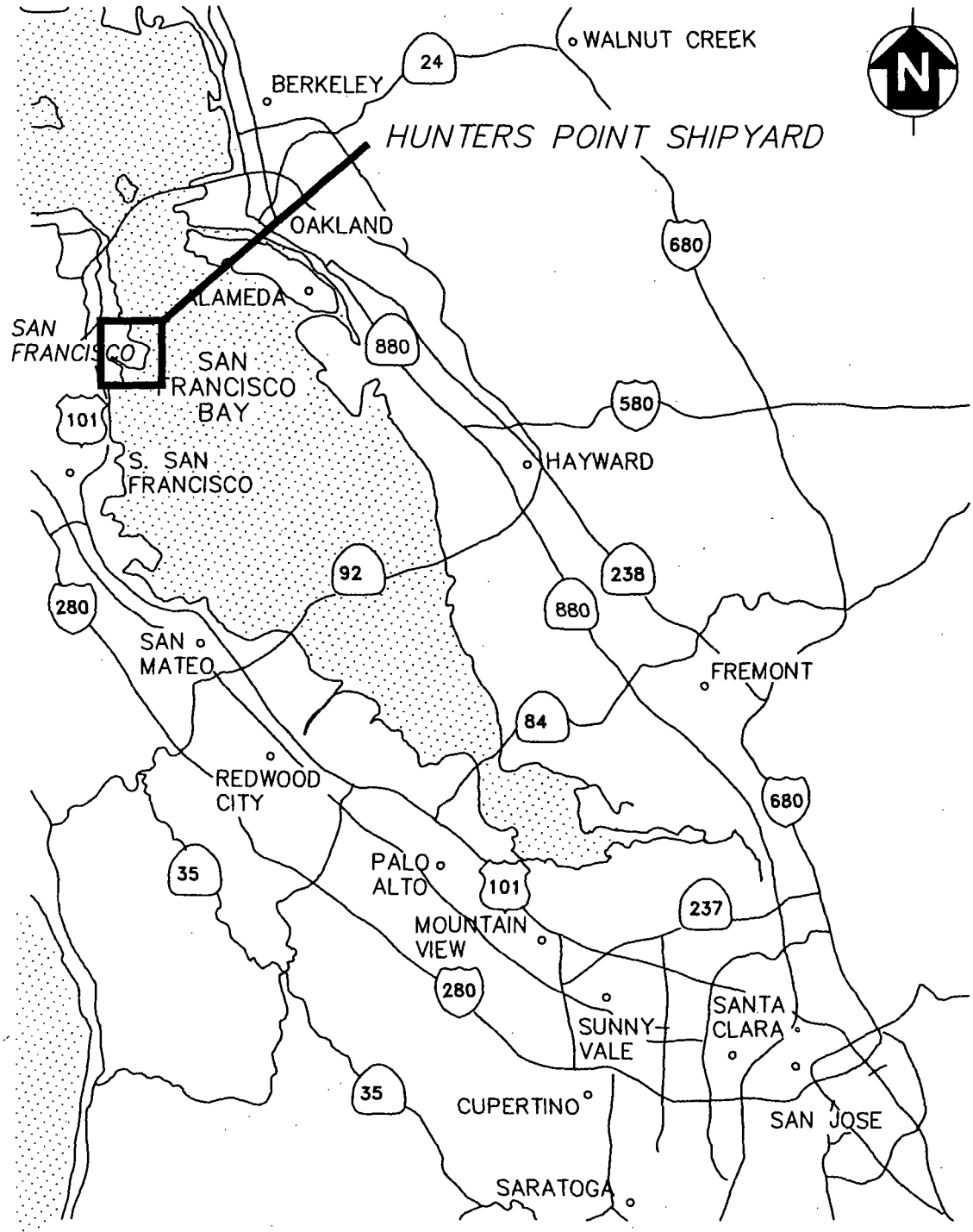
_____. 2008. Final Parcel B Technical Memorandum in Support of a Record of Decision Amendment Radiological Addendum, Parcel B, Hunters Point Shipyard, San Francisco, California. March 14.

FIGURES



NOT TO SCALE

DRAWN BY: MD	CHECKED BY: RA	APPROVED BY: RA	DCN: SEST-3220-0002-0017	DRAWING NO: 0001A1.DWG
DATE: 08/2008	REV:		CTO: 0002	

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PLOT/UPDATE: FEB 07 2008 11:15:05

Figure 1-1
LOCATION MAP

FINAL WORK PLAN
HUNTERS POINT SHIPYARD, PARCEL B
METHANE SOURCE AREA
TIME-CRITICAL REMOVAL ACTION

SES-TECH

DRAWN BY: MD	CHECKED BY:	DCN: SEST-3220-0002-0017	DRAWING NO: 0001A2.DWG
DATE: 08/2008	REV:	CTO: 0002	

LEGEND

- NAVY PROPERTY BOUNDARY
- PARCEL BOUNDARY
- IR INSTALLATION RESTORATION
- B PARCEL LETTER

N

400' 0 400' 800'

SCALE: 1" = 800'

Figure 1-2
SITE LOCATION MAP

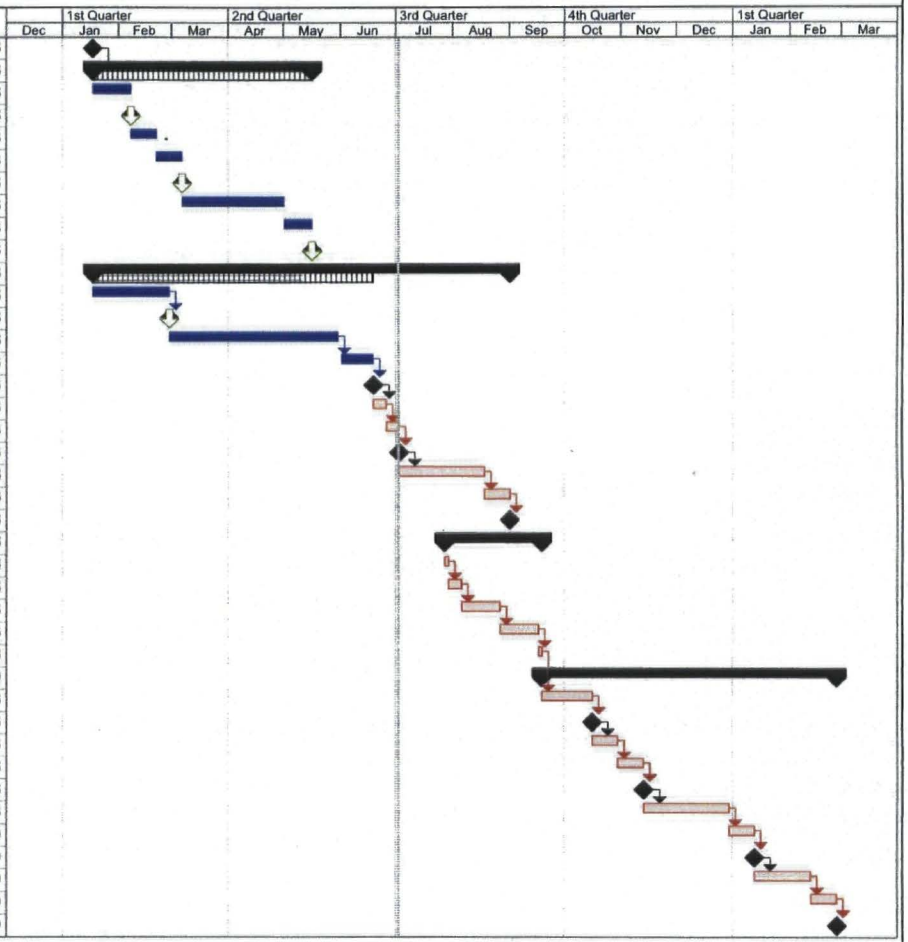
FINAL WORK PLAN
HUNTERS POINT SHIPYARD, PARCEL B
METHANE SOURCE AREA
TIME-CRITICAL REMOVAL ACTION

SES-TECH

\\HUNTERSPOINT\COMMON\0001A2.DWG
PLOT/UPDATE: FEB 07 2008 11:18:42

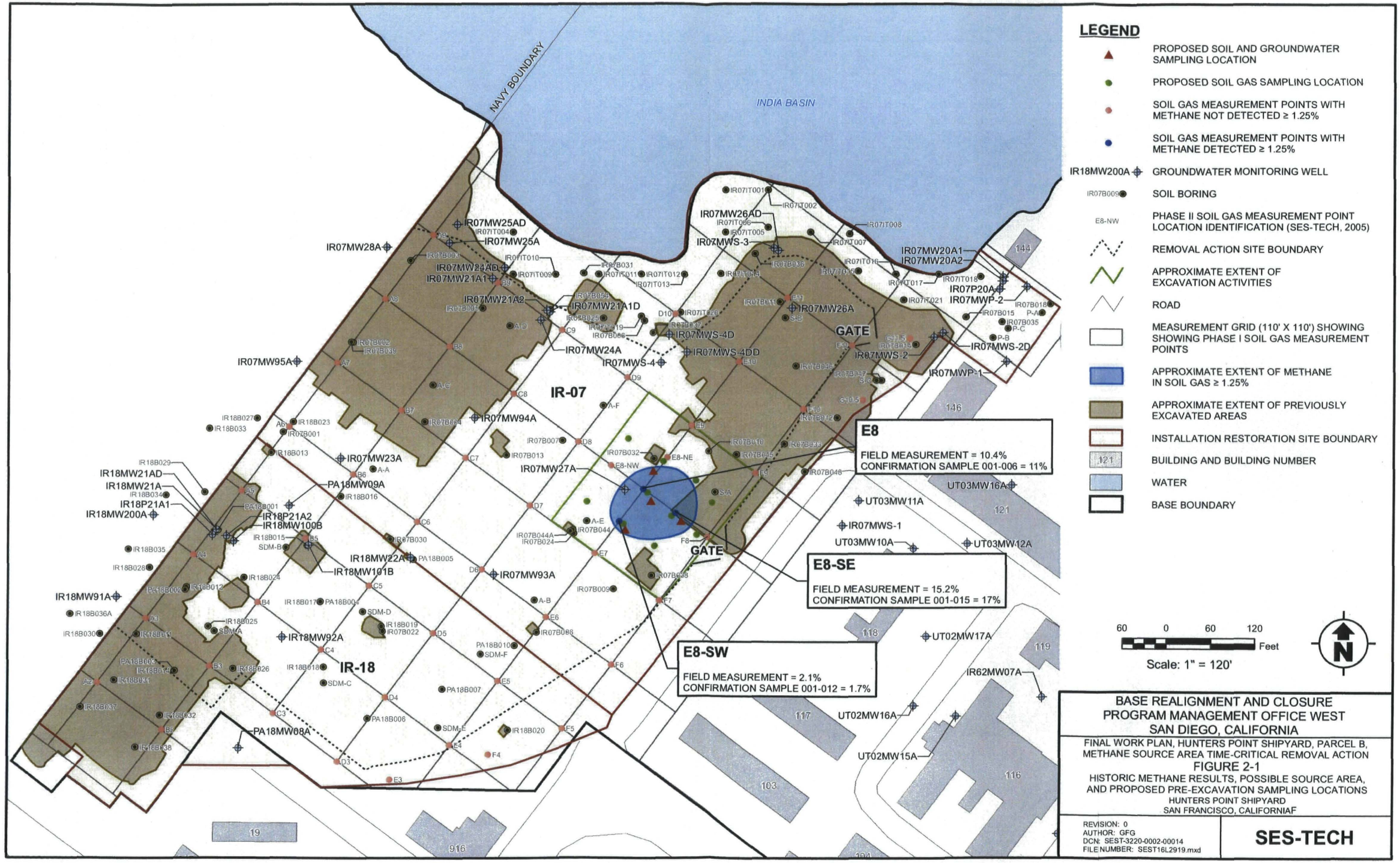
Figure 1-3
Project Schedule

ID	Task Name	Duration	Start	Finish
1	Notice to Proceed	0 days	Fri 1/18/08	Fri 1/18/08
2	Action Memorandum	86 days	Fri 1/18/08	Fri 5/16/08
3	Prepare Pre-Draft Action Memorandum	3 wks	Fri 1/18/08	Thu 2/7/08
4	Submit Pre-Draft Action Memorandum	0 wks	Thu 2/7/08	Thu 2/7/08
5	Internal Navy review	2 wks	Fri 2/8/08	Thu 2/21/08
6	Prepare RTCs and revised text	2 wks	Fri 2/22/08	Thu 3/6/08
7	Submit Draft Action Memorandum	0 days	Thu 3/6/08	Thu 3/6/08
8	Regulatory review	8 wks	Fri 3/7/08	Thu 5/1/08
9	Prepare RTCs and Final Action Memorandum (No Draft Final)	2.2 wks	Fri 5/2/08	Fri 5/16/08
10	Submit Final Action Memorandum	0 wks	Fri 5/16/08	Fri 5/16/08
11	Planning Documents	161.5 days	Fri 1/18/08	Mon 9/1/08
12	Prepare Internal Draft Planning Documents	6 wks	Fri 1/18/08	Thu 2/28/08
13	Submit Internal Draft Planning Documents	0 wks	Thu 2/28/08	Thu 2/28/08
14	Internal Navy review	13.2 wks	Fri 2/29/08	Fri 5/30/08
15	Prepare Revised Internal Draft Planning Documents	2.6 wks	Mon 6/2/08	Wed 6/18/08
16	Submit Internal Draft Planning Documents for Navy review	0 days	Wed 6/18/08	Wed 6/18/08
17	Navy review	5 days	Thu 6/19/08	Wed 6/25/08
18	Prepare RTCs and Draft Planning Documents	5 days	Thu 6/26/08	Wed 7/2/08
19	Submit Draft Planning Documents	0 days	Wed 7/2/08	Wed 7/2/08
20	Regulatory review	6.5 wks	Thu 7/3/08	Mon 8/18/08
21	Prepare RTCs and Final Planning Documents	2 wks	Mon 8/18/08	Mon 9/1/08
22	Submit Final Planning Documents	0 days	Mon 9/1/08	Mon 9/1/08
23	Field Work	39 days	Mon 7/28/08	Thu 9/18/08
24	Mobilization	2 days	Mon 7/28/08	Tue 7/29/08
25	Perform pre-excavation characterization	1 wk	Wed 7/30/08	Tue 8/5/08
26	Perform excavation and radiological screening (0 ft - 15 ft)	3 wks	Wed 8/6/08	Tue 8/26/08
27	Perform excavation and radiological screening (15 ft - 25 ft) *conti	3 wks	Wed 8/27/08	Tue 9/16/08
28	Site restoration	2 days	Wed 9/17/08	Thu 9/18/08
29	Closeout Report	115 days	Fri 9/19/08	Thu 2/26/09
30	Prepare Pre-Draft Closeout Report	4 wks	Fri 9/19/08	Thu 10/16/08
31	Submit Pre-Draft Closeout Report	0 days	Thu 10/16/08	Thu 10/16/08
32	Internal Navy review	2 wks	Fri 10/17/08	Thu 10/30/08
33	Prepare RTCs and revised text	2 wks	Fri 10/31/08	Thu 11/13/08
34	Submit Draft Closeout Report	0 days	Thu 11/13/08	Thu 11/13/08
35	Regulatory review	6.5 wks	Fri 11/14/08	Tue 12/30/08
36	Prepare RTCs and Draft Final Closeout Report	2 wks	Tue 12/30/08	Tue 1/13/09
37	Submit Draft Final Closeout Report	0 days	Tue 1/13/09	Tue 1/13/09
38	Regulatory review	4.5 wks	Tue 1/13/09	Thu 2/12/09
39	Prepare RTCs and Final Closeout Report	2 wks	Fri 2/13/09	Thu 2/26/09
40	Submit Final Closeout Report	0 days	Thu 2/26/09	Thu 2/26/09



SAP Schedule.mpp
Wed 7/2/08

Critical
Critical Split
Critical Progress
Task
Split
Task Progress
Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Project Summary
External Tasks
External Milestone
Deadline



BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

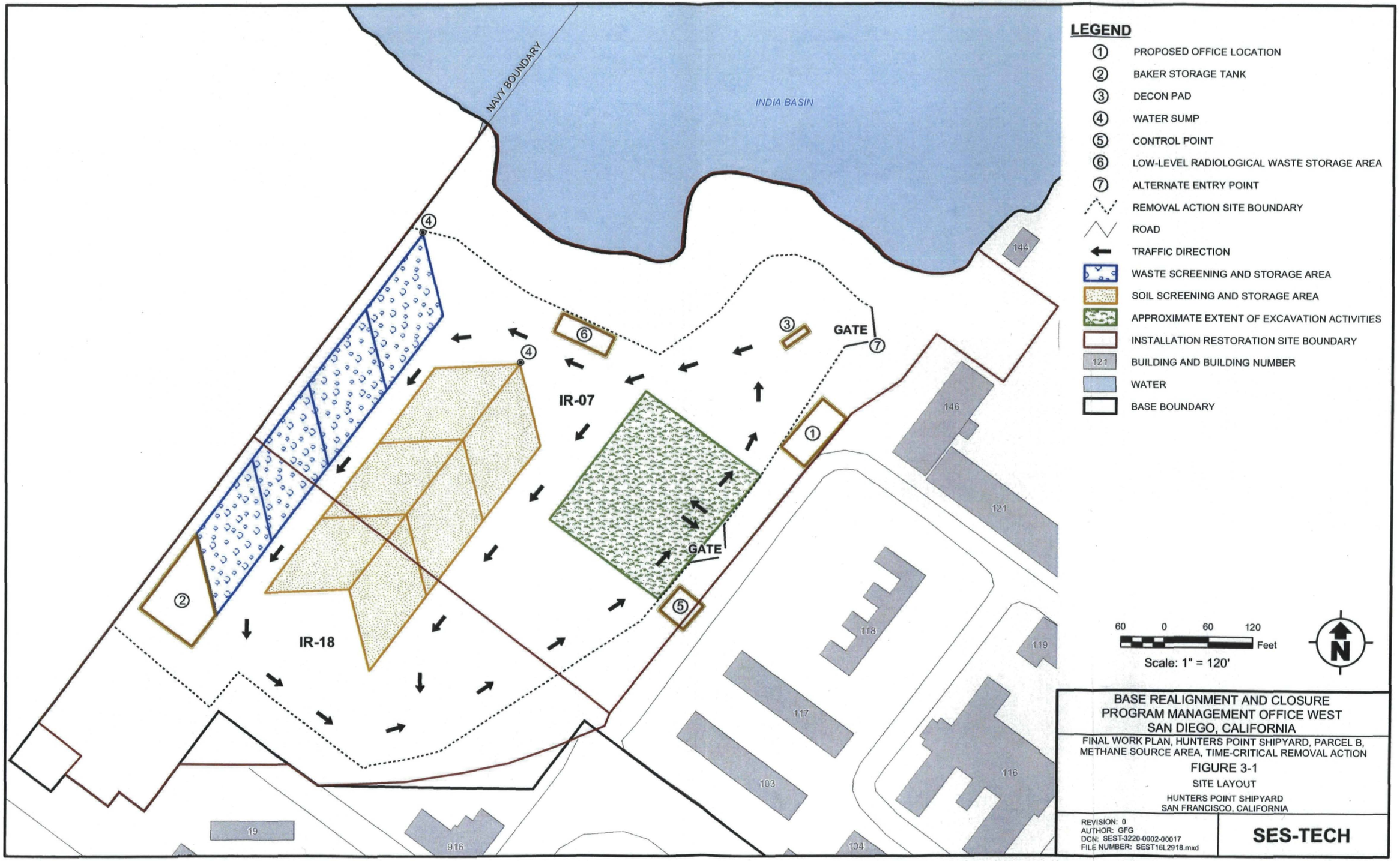
FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA TIME-CRITICAL REMOVAL ACTION

FIGURE 2-1

HISTORIC METHANE RESULTS, POSSIBLE SOURCE AREA,
AND PROPOSED PRE-EXCAVATION SAMPLING LOCATIONS
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIAF

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-00014
FILE NUMBER: SEST16L2919.mxd

SES-TECH



BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA, TIME-CRITICAL REMOVAL ACTION

FIGURE 3-1

SITE LAYOUT

HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-00017
FILE NUMBER: SEST16L2918.mxd

SES-TECH

ATTACHMENT 1

CONSTRUCTION QUALITY CONTROL FORMS

See instructions on reverse
No carbon paper is required to complete this form
No transmittal letter required

CATALOG CUT/SHOP DRAWING TRANSMITTAL AND APPROVAL
SOUTHWESTNAVFACENGCOM 4355 / 2 (10-89)

SUBMITTAL NO.	CQC CLAUSE ☐ IS APPLICABLE ☐ IS NOT APPLICABLE	
REFERENCES TO USE WHEN CQC CLAUSE IS APPLICABLE	**PART I – FOR CONTRACTOR USE**	REFERENCES TO USE WHEN CQC CLAUSE IS NOT APPLICABLE
(A) ROICC/REICC	FROM (*Contractor*) SES-TECH Remediation Services. 1230 Columbia Street, Suite 540 San Diego, CA 92101	TO (A) — (A) DESIGNER
	CONTRACT NO.	CONTRACT TITLE
(B) *(Check one)* ☐ RECORD ☐ APPROVAL	THE FOLLOWING ITEM IS SUBMITTED FOR (B) PER SPECIFICATION SECTION NUMBER	(B) APPROVAL
	CERTIFICATION (This form shall not be used to forward proposed substitutions) IT IS HEREBY CERTIFIED THAT THE ☐ EQUIPMENT ☐ MATERIAL SHOWN AND MARKED IN THIS SUBMITTAL IS THAT PROPOSED TO BE INCORPORATED INTO CONTRACT N62473-07-D-3220, CTO 00XX IS IN COMPLIANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS AND CAN BE INSTALLED IN THE ALLOCATED SPACES.	
(C) AUTHORIZED CONTRACTOR QUALITY CONTROL REPRESENTATIVE	CERTIFIED BY (C) — DATE	(C) PERSON DESIGNATED BY CONTRACTOR AS HAVING AUTHORITY TO SIGN CERTIFICATION
	PART II – FOR DESIGNER USE	
	FROM (*Designer*) — TO (ROICC/REICC)	
(D) CURSORY REVIEW REQUIRED ON RECORD COMES – REPLY TO ROICC ONLY IF APPROPRIATE. DETAILED REVIEW REQUIRED ON SUBMITTALS FOR GOVERNMENT APPROVAL STAMP AND MARK EACH COPY AS APPROPRIATE.	THIS SUBMITTAL HAS BEEN REVIEWED (D). THE FOLLOWING RECOMMENDATION IS MADE:	(D) DETAILED REVIEW REQUIRED. STAMP AND MARK EACH COPY AS APPROPRIATE
	SIGNATURE — DATE	
	PART III – FOR ROICC/REICC USE	
(E) DESIGNER *(Copy to ROICC)*	FROM (*ROICC/REICC*) — TO (E)	(E) CONTRACTOR *(Copy to ROICC)*
	ENCLOSURES ARE RETURNED WITH THE FOLLOWING COMMENTS:	
	SIGNATURE — DATE	

INSTRUCTIONS

Enter submittal number.
Check applicable CQC clause.

CONSTRUCTION CONTRACTOR – PART I

From: *Construction contractor's name and address.*
To: *Designer's name and address or ROICC/REICC as applicable.*

Enter contract number.

Enter title of contract and location.

Describe item being transmitted. A separate form must be used for each set of catalog cuts or shop drawings. Include name of manufacturer, catalog sheets, drawing no., name of item, and number of copies forwarded.

Check submittal for record or approval purposes.

Type date and name.

Sign original and one.

Distribution (as applicable to CQC clause):

Send to designer: *original and four transmittal forms with the seven copies of catalog cuts or shop drawings. When factory inspection is required, send eight copies.*

Send to ROICC/REICC: *one carbon copy of form.*

Send to ROICC/REICC (CQC): *Original and three copies of catalog cuts or shop design.*

Retain one copy for your files.

DESIGNER (A&E CONTRACTOR, SOUTHWESTNAVFACENGCOM) OR OICC RESPONSIBLE FOR DESIGN – PART II

From: *Designer's name and address.*
To: *ROICC/REICC and address.*

Enter recommended action (i.e., approval recommended or disapproved, with appropriate comments).

Type date and name.

Sign original and one.

Distribution:

Send to ROICC/REICC: *original and three copies with six (or seven when factor inspection is required) copies of catalog cuts or shop drawings.*

Retain one copy of form and one copy of cuts or drawings for your files.

ROICC OR REICC – PART III

From: *ROICC or REICC and address.*
To: *Construction contractor's name and address.*

Enter action taken (i.e., approved subject to, etc.).

Type date and name.

Sign original and one.

Distribution:

Send to construction contractor: *original with three copies of cuts or drawings*

Send to ROICC one carbon copy of form with one copy of cut or drawings.

Retain two copies of form and two copies of cuts or drawings: *one for field use and one for ROICC/REICC file.*

NOTE: When factory inspection is required, forward one approved copy of cuts or drawings to the OICC, Construction Division. Cover transmittal should state the information is forwarded for factory inspection.

FIELD CHANGE REQUEST FORM

Contract No.	CTO No.	Field Change Request Form No.
N62473-07-D-3220		FCRF-

Additional Details

Will this change result in a contract cost or time change? ☐ Yes ☐ No

Estimate of contract cost or time charge (if any) _____

Preparer (signature)	Date	Preparer's Title	Site Superintendent (Signature)	Date

Disposition

☐ Approved.

☐ Not approved (give reason). _____

SES-TECH Engineer (signature) (if engineering related)	Date	SES-TECH Project Manager (signature)	Date
☐ Comments (attached) ☐ No Comments		☐ Comments (attached) ☐ No Comments	
SES-TECH PESM (signature)	Date	SES-TECH Scientist (signature) (if science related)	Date
☐ Comments (attached) ☐ No Comments		☐ Comments (attached) ☐ No Comments	
SES-TECH QC Manager (signature)	Date		
☐ Comments (attached) ☐ No Comments			

Distribution: Original to Project File, Copy to Site File,
Project Manager, DON RPM, DON ROICC, PQCM, QCM, Site Superintendent

FIELD CHANGE REQUEST FORM

Contract No.	CTO No.	Field Change Request Form No.
N62473-07-D-3220		FCRF-
Location		Date

RE: Drawing No. _____ Title _____

Specification Section _____ Title _____

Other _____

Description (items involved, submit sketch, if applicable)

Reason for Change

Recommended Disposition (submit sketch, if applicable)

DESIGN CHANGE NOTICE

CTO # _____ DCN # _____ DATE_____

LOCATION _____ NTR / RPM _____

Re: _____ Drawing No. _____ Title _____

_____ Spec. Section _____ Title _____

_____ Other _____ Title _____

1. Description of Change (Items involved, submit sketch, if applicable): (Use continuation sheet if necessary)

Engineering "HOLD" placed on all activities in area defined herein pending receipt of formally revised document(s) and / or Released for construction basis of modifications prescribed by this

2. Reason for Change (Use Continuation Sheet if)

___ Field Change Request (FCR _____)
___ Required Modifications to Drawings or
___ Other _____

Exhibits Attached

_____ Copies of marked-up area of
_____ Field Change Request (FCR ____)
_____ Other (Describe)

3. COMMENTS

Originator _____ Date____

1) QC Manager (Signature)	Date	2) Project Manager (Signature)	Date

Distribution:

Original to CTO File, Copy to Site

Signatories from above, Site Superintendent, PQCM, SHSS

INITIAL PHASE CHECKLIST

		SPEC SECTION	DATE
CONTRACT NO N62473-07-D-3220 CTO No.	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED ____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

PROCEDURE COMPLIANCE

IDENTIFIY FULL COMPLIANCE WITH PROCEDURES IDENTIFIED AT PREPARATORY. COORDINATE PLANS, SPECIFICATIONS, AND SUBMITTALS.

COMMENTS:

PRELIMINARY WORK

ENSURE PRELIMINARY WORK IS COMPLETE AND CORRECT. IF NOT, WHAT ACTION IS TAKEN?

WORKMANSHIP

ESTABLISH LEVEL OF WORKMANSHIP.

WHERE IS WORK LOCATED?

IS SAMPLE PANEL REQUIRED? YES ☐ NO ☐

WILL THE INIITAL WORK BE CONSIDERED AS A SAMPLE? YES ☐ NO ☐

(IF YES, MAINTAIN IN PRESENT CONDITION AS LONG AS POSSIBLE AND DESCRIBE LOCATION OF SAMPLE)

RESOLUTION

RESOLVE ANY DIFFERENCES.

COMMENTS:

CHECK SAFETY

REVIEW JOB CONDITIONS USING EM 385-1-1 AND JOB HAZARD ANALYSIS

COMMENTS:

OTHER

OTHER ITEMS OR REMARKS

PQCM DATE

NONCONFORMANCE REPORT

	Report No.
Client or Project:	Drawing No./Spec. No.
Supplier, Construction QC or Contractor	P.O. No.
Description of Component, Part or System	

I. Description of Nonconformance *(Items involved, specification, code or standard to which items do not comply, submit sketch if applicable)*

Name and Signature of Person Reporting Nonconformance	Title/Company	Date

II. Recommended Disposition *(Submit sketch, if applicable)*

Name and Signature of Person Recommending Disposition	Title/Company	Date

III. Evaluation of Disposition by SES-TECH, Reason for Disposition

IV. Corrective Action ☐ Required ☐ Not Required

V. ☐ Engineering	☐ QA/QC	☐ Construction	☐ Other
Name *(Signature)*	Name *(Signature)*	Name *(Signature)*	Name *(Signature)*
Date	Date	Date	Date
☐ Accepted ☐ Rejected ☐ Accepted with Comments	☐ Accepted ☐ Rejected ☐ Accepted with Comments	☐ Accepted ☐ Rejected ☐ Accepted with Comments	☐ Accepted ☐ Rejected ☐ Accepted with Comments

VI. Verification of Disposition ☐ Required ☐ Not Required

By	Signature	Title	Date

NONCONFORMANCE REPORT LOG

PROJECT TITLE: _____

PROJECT LOCATION: _____

CONTRACTOR: _____

NCR NO.	HOLD TAG NO.	DESCRITION OF CONDITIONS/ ITEM AFFECTED	LOCATION	DATE					REMARKS
				VALIDATION	DISPOSITION/ APPROVAL	RE-INSPECTION	CLOSURE	HOLD TAG REMOVAL	

PREPARATORY PHASE CHECKLIST

SPEC SECTION	DATE

CONTRACT NO N62473-07-D-3220 CTO No.	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED ____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

SUBMITTALS

REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER. HAVE ALL SUBMITTALS BEEN APPROVED? YES ☐ NO ☐

IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED? _____

ARE ALL MATERIALS ON HAND? YES ☐ NO ☐

IF NO, WHAT ITEMS ARE MISSING? _____

CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES.)

COMMENTS: _____

MATERIAL STORAGE

ARE MATERIALS STORED PROPERLY? YES ☐ NO ☐

IF NO, WHAT ACTION IS TAKEN? _____

SPECIFICATIONS

REVIEW EACH PARAGRAPH OF SPECIFICATIONS. _____

DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK. _____

CLARIFY ANY DIFFERENCES. _____

PRELIMINARY WORK & PERMITS

ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.

IF NOT, WHAT ACTION IS TAKEN? _____

PREPARATORY PHASE CHECKLIST (CONTINUED ON SECOND PAGE)		SPEC SECTION	DATE
CONTRACT NO N68711-98-D-5713 CTO No.	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

TESTING

IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.

WHEN REQUIRED?

WHERE REQUIRED?

REVIEW TESTING PLAN.

HAS TEST FACILITIES BEEN APPROVED?

SAFETY

ACTIVITY HAZARD ANALYSIS APPROVED? YES ☐ NO ☐

REVIEW APPLICABLE PORTION OF EM 385-1-1.

MEETING COMMENTS

NAVY/ROICC COMMENTS DURING MEETING.

OTHER ITEMS OR REMARKS

OTHER ITEMS OR REMARKS:

PQCM DATE

CONTRACTOR PRODUCTION REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE	Enter Date (DD/MMM/YY)	
CONTRACT NO: N62473-07-D-3220	TITLE AND LOCATION: Enter Title and Location of Construction Contract Here	REPORT NO: Enter Report # Here
CONTRACTOR: SES-TECH Remediation Services	SUPERINTENDENT: Enter Superintendent's Name Here	
AM WEATHER: Enter AM Weather Data Here	PM WEATHER: Enter PM Weather Data Here	MAX TEMP (F): Enter Max Temp Here / MIN TEMP (F): Enter Min Temp Here

WORK PERFORMED TODAY

Schedule Activity No.	WORK LOCATION AND DESCRIPTION	EMPLOYER	NUMBER	TRADE	HRS

JOB SAFETY

WAS A JOB SAFETY MEETING HELD THIS DATE? (If YES attach copy of the meeting minutes)	☐ YES	☐ NO	TOTAL WORK HOURS ON JOB SITE, THIS DATE, INCL CON'T SHEETS:
WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? (If YES attach copy of completed OSHA report)	☐ YES	☐ NO	CUMULATIVE TOTAL OF WORK HOURS FROM PREVIOUS REPORT:
WAS CRANE/MANLIFT/TRENCHING/SCAFFOLD/HV ELEC/HIGH WORK/ HAZMAT WORK DONE? (If YES attach statement or checklist showing inspection performed.)	☐ YES	☐ NO	
WAS HAZARDOUS MATERIAL/WASTE RELEASED INTO THE ENVIRONMENT? (If YES attach description of incident and proposed action.)	☐ YES	☐ NO	TOTAL WORK HOURS FROM START OF CONSTRUCTION:

Schedule Activity No.	LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED	☐ SAFETY REQUIREMENTS HAVE BEEN MET.

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB (INDICATE SCHEDULE ACTIVITY NUMBER)

Schedule Activity No.	Submittal #	Description of Equipment/Material Received

CONSTRUCTION AND PLANT EQUIPMENT ON JOB SITE TODAY. INDICATE HOURS USED AND SCHEDULE ACTIVITY NUMBER.

Schedule Activity No.	Owner	Description of Construction Equipment Used Today (incl Make and Model)	Hours Used

Schedule Activity No.	REMARKS

CONTRACTOR/SUPERINTENDENT _____ DATE _____

CONTRACTOR PRODUCTION REPORT
(CONTINUATION SHEET)

CONTRACT NO	TITLE AND LOCATION	DATE	Enter Date (DD/MMM/YY)
N62473-07-D-3220	Enter Title and Location of Construction Contract Here	REPORT NO	Enter Report # Here

WORK PERFORMED TODAY

Schedule Activity No.	WORK LOCATION AND DESCRIPTION	EMPLOYER	NUMBER	TRADE	HRS

Schedule Activity No.	LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB (INDICATE SCHEDULE ACTIVITY NUMBER)

Schedule Activity No.	Submittal #	Description of Equipment/Material Received

CONSTRUCTION AND PLANT EQUIPMENT ON JOB SITE TODAY. INDICATE HOURS USED AND SCHEDULE ACTIVITY NUMBER.

Schedule Activity No.	Owner	Description of Construction Equipment Used Today (incl Make and Model)	Hours Used

Schedule Activity No.	REMARKS

INCLUDE ALL PERSONNEL WORK HOURS IN THE WORK PERFORMED SECTION ON THIS SHEET
INTO THE FRONT CONTRACTOR PRODUCTION REPORT

CONTRACTOR QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE: Enter (DD/MMM/YY)

REPORT NO: Enter Rpt # Here

PHASE | CONTRACT NO: N62473-07-D-3220 | CONTRACT TITLE: Enter Title and Location of Construction Contract Here

PREPARATORY

WAS PREPARATORY PHASE WORK PREFORMED TODAY? YES ☐ NO ☐

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST.

Schedule Activity No.	Definable Feature of Work	Index #

INITIAL

WAS INITIAL PHASE WORK PREFORMED TODAY? YES ☐ NO ☐

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL INITIAL PHASE CHECKLIST.

Schedule Activity No.	Definable Feature of Work	Index #

FOLLOW-UP

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES ☐ NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES ☐ NO ☐

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)

Schedule Activity No.	Description

REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)

Schedule Activity No.	Description

REMARKS (Also Explain Any Follow-Up Phase Checklist Item From Above That Was Answered "NO"), Manuf. Rep On-Site, etc.

Schedule Activity No.	Description

On behalf of the contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge except as noted in this report.

AUTHORIZED QC MANAGER AT SITE — DATE

GOVERNMENT QUALITY ASSURANCE REPORT

DATE

QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT

Schedule Activity No.	Description

GOVERNMENT QUALITY ASSURANCE MANAGER — DATE

CONTRACTOR QUALITY CONTROL REPORT

(CONTINUATION SHEET)
(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE: Date (DD/MMM/YY)
REPORT NO.: Enter Rpt # Here

PHASE	CONTRACT NO	N62473-07-D-3220	CONTRACT TITLE	Enter Title and Location of Construction Contract Here

FOLLOW-UP

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES ☐ NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES ☐ NO ☐

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REMARKS (Also Explain Any Checklist Item From Above That Was Answered "NO"), Manuf. Rep. On-Site, etc.

Schedule Activity No.	Description

MONTHLY REWORK ITEMS LIST

Contract No. **N62473-07-D-3220** CTO No. Project :

Contractor: SES-TECH Remediation Services Date:

NUMBER	DATE IDENTIFIED	DESCRIPTION	CONTRACT REQUIREMENT (Spec. Section and Par. No., Drawing No. and Detail No., etc.)	ACTION TAKEN BY QC MANAGER	RESOLUTION	DATE COMPLETED

SUBMITTAL REGISTER

TITLE AND LOCATION	CONTRACTOR	CONTRACT NO.
	SES-TECH Remediation Services	N62473-07-D-3220, CTO No.

TRANSMITTAL NO	SPECIFICATION	PARAGRAPH NO	ac	CONTRACTOR SCHEDULE DATES: CLASSIFICATION / GOVT REVIEWER	CONTRACTOR SCHEDULE DATES: SUBMIT	CONTRACTOR SCHEDULE DATES: NEED APPROVAL BY	CONTRACTOR SCHEDULE DATES: NEED MATERIAL BY	CONTRACTOR ACTION: ACTION CODE	CONTRACTOR ACTION: DATE OF ACTION	CONTRACTOR ACTION: ARPC PDR AFTAR EUTHR FWD AATTER	APPROVING AUTHORITY: OTHER REVIEWER	APPROVING AUTHORITY: DATE OF ACTION RECEIVED FROM	APPROVING AUTHORITY: ACTION CODE	APPROVING AUTHORITY: DATE OF ACTION	CONFORM/APPROVED TO DATE	CONFORMED RETURNED	REMARKS
(a)	(b)	(c)		(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)		(p)

Action Code: NR: Not Reviewed AN: Approved as Noted A: Approved RR: Disapproved; Revise and Resubmit

TESTING PLAN AND LOG

CONTRACT NUMBER	PROJECT TITLE AND LOCATION	CONTRACTOR
N62473-07-D-3220, CTO No.		SES-TECH Remediation Services

SPECIFICATION SECTION AND PARAGRAPH NUMBER	ITEM OF WORK	TEST REQUIRED	ACCREDITED/ APPROVED LAB		SAMPLED BY	TESTED BY	LOCATION OF TEST		FREQUENCY	DATE COMPLETED	DATE FORWARDED TO CONTR. OFF.	REMARKS
			YES	NO			ON SITE	OFF SITE				

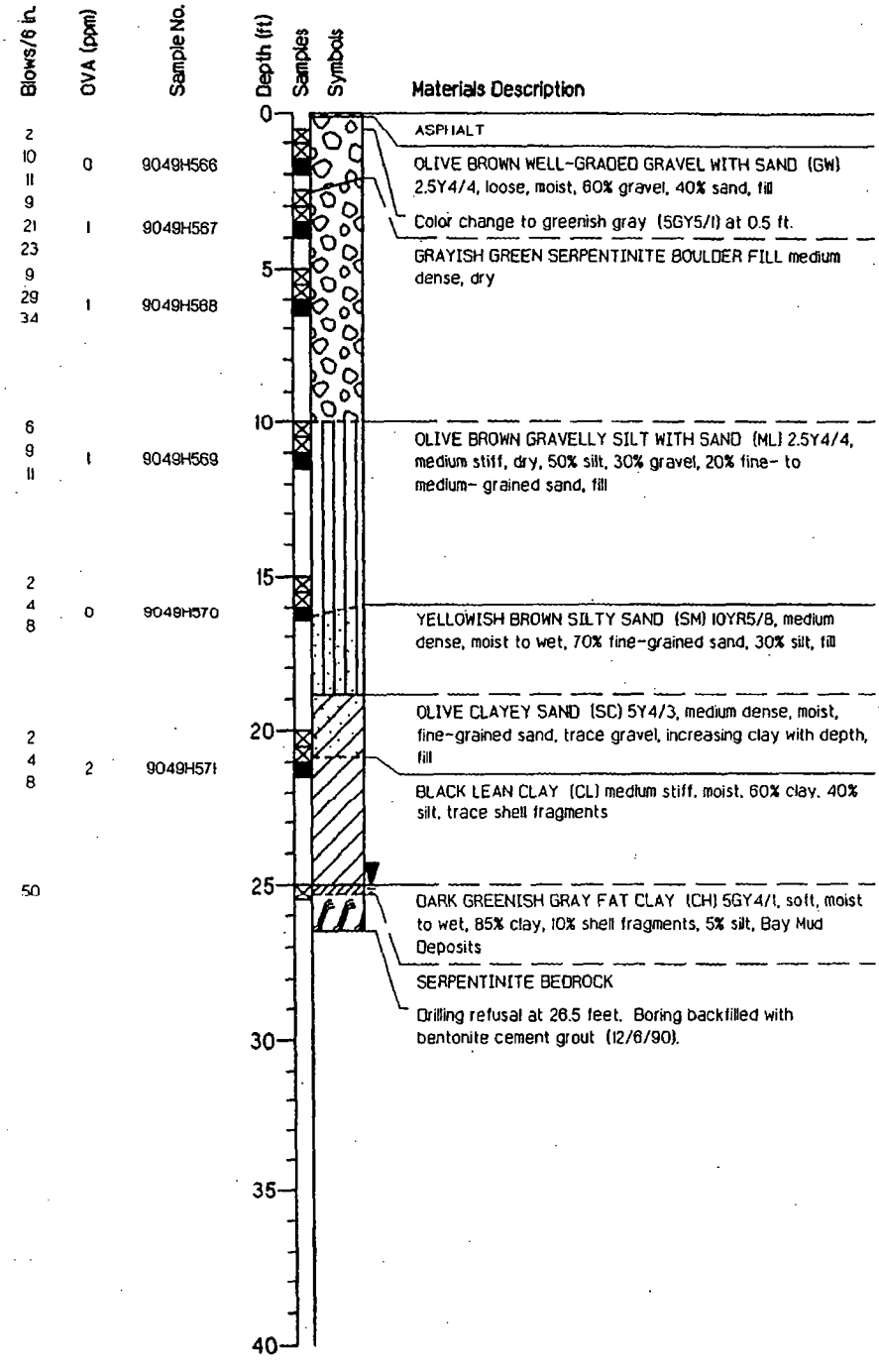
ATTACHMENT 2

IR-07 BORING LOGS

PRC Environmental Management, Inc.

Adapted from Harding Lawson Associates

LOG OF BORING IR07B007



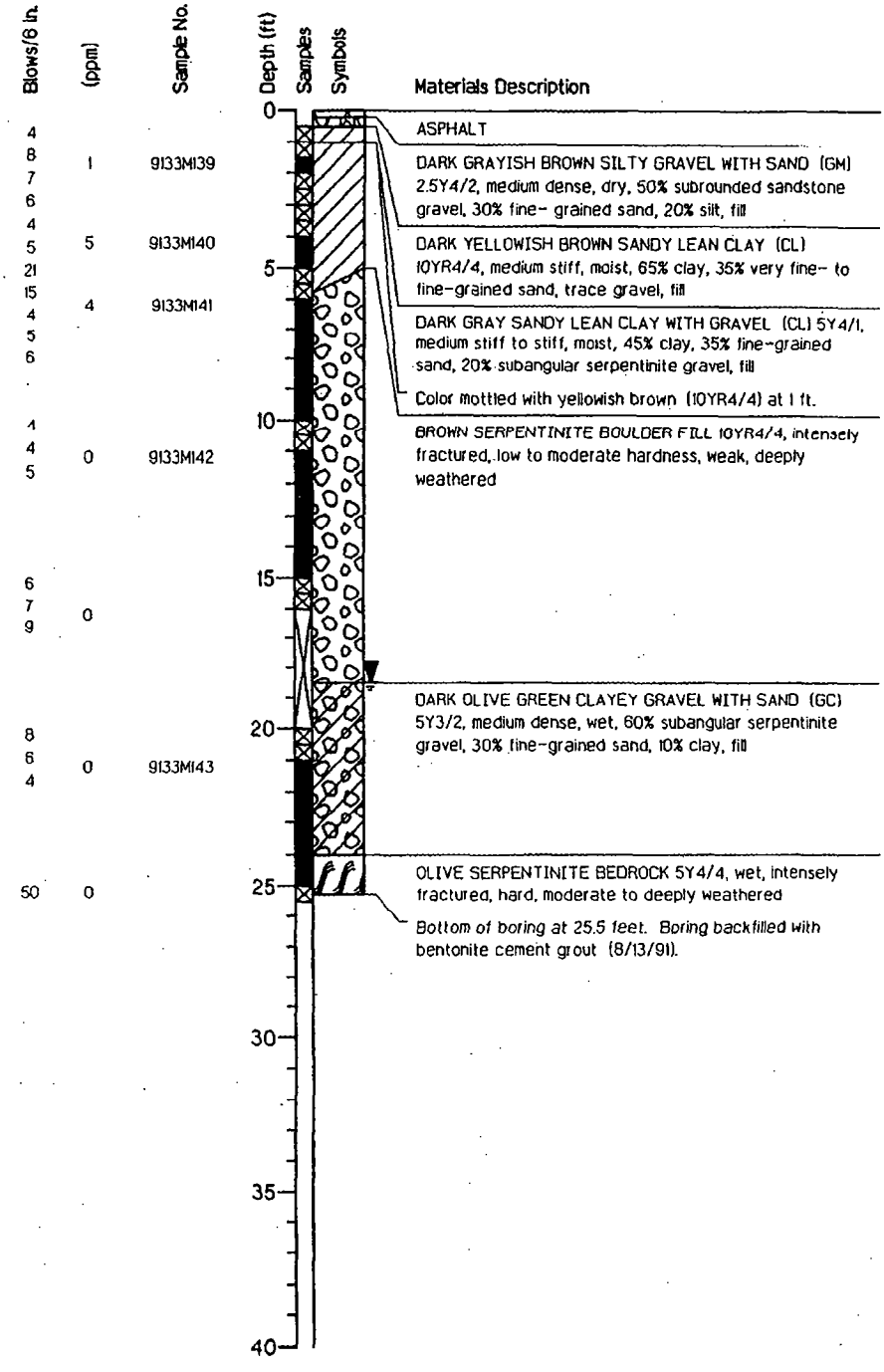
Project Number		Date Drilled	12/05/1990
Project Name	Parcel B RI Report	GS Elevation	15.58
Project Task	Hunters Point Annex	Water Level	25 ft.
Project Location	San Francisco, California	Total Depth Of Hole	26.5 ft.
Equipment	CME 750 (HSA) 8 in. diam.		

Figure

PRC Environmental Management, Inc.

Adapted from Harding Lawson Associates

LOG OF BORING IR07B013



Project Number _____

Project Name Parcel B RI Report

Project Task Hunters Point Annex

Project Location San Francisco, California

Equipment CME 55 (HSA) 8

Date Drilled 08/13/1991

GS Elevation 15.81

Water Level 18.5 ft.

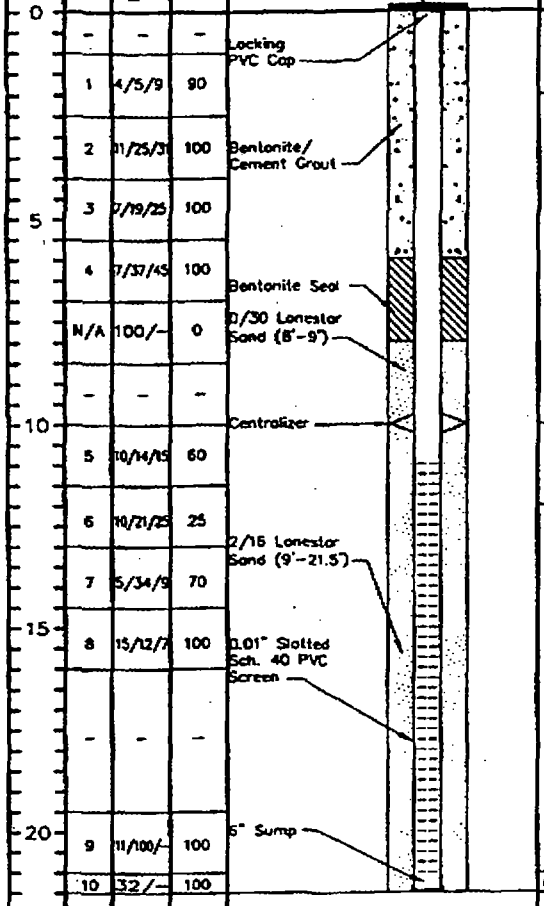
Total Depth Of Hole 25.5 ft.

Figure

MONITORING WELL IR07MW27A

COORDINATES: N. 453649.86
E 1459864.33

FIELD GEOLOGIST M. Geisler — DATE BEGAN 4/8/99
CHECKED BY W. Akiyama — DATE FINISHED 4/8/99
APPROVED BY – — SURFACE ELEV. 16.42 ft.
TOTAL DEPTH 21.5 ft. — T.O.C. ELEV. 16.15 ft.



USCS	PROFILE	DESCRIPTION	
cl		ASPHALT SURFACE. SILTY CLAY; olive, (5y 4/3), moist, firm.	2.0'
sp		SAND; dark olive gray, medium to fine, moist, becomes clayey at 4.0' (serpentine), medium dense. Black grains, (20%). Becomes olive at 6', wood fragments, tyvek, cloth, (fill). Refusal; drill to 10'.	10.0'
cl		SILTY CLAY; dark olive gray, (5y 4/1), moist, stiff, brick fragments, Tyvek, cloth.	12.0'
sc		SANDY CLAY; dark olive gray, wet, stiff, no debris. ▽ Groundwater encountered at 14'. Refusal; black, (10yr 2/1), gravel, angular 0.5"-1" diameter.	21.0'
rock		SERPENTINE BEDROCK; olive, weathered.	

TOTAL DEPTH 21.5 FEET

DRILLER : C. St. Pierre
DRILLING CO. : Gregg Drilling and Testing, Inc.
DRILLING METHOD : 8" O.D. Hollow Stem Auger, Reamed to 10" O.D.
SAMPLING METHOD : California Modified Split-spoon Sampler
PROJECT NAME: D.O. 109
LOCATION : Hunters Point Shipyard
PROJECT NO. : 773247

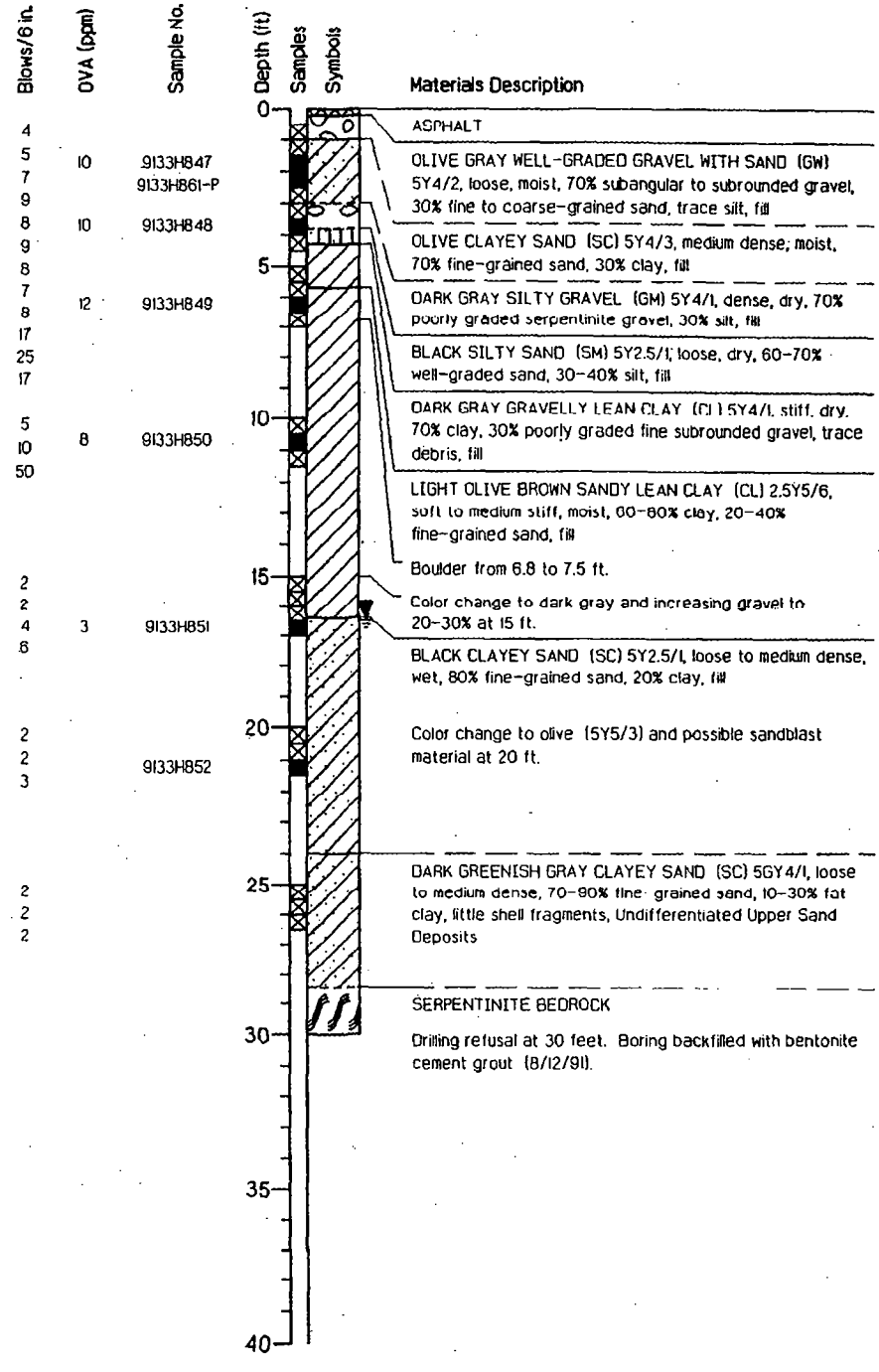
DRAWN BY	T.R.S.	CHECKED BY	W.S.A.	FILE NAME & DISK NUMBER	HP-7MW27A
DATE	2/24/00	APPROVED BY	–		

INTERNATIONAL TECHNOLOGY CORPORATION

PRC Environmental Management, Inc.

Adapted from Harding Lawson Associates

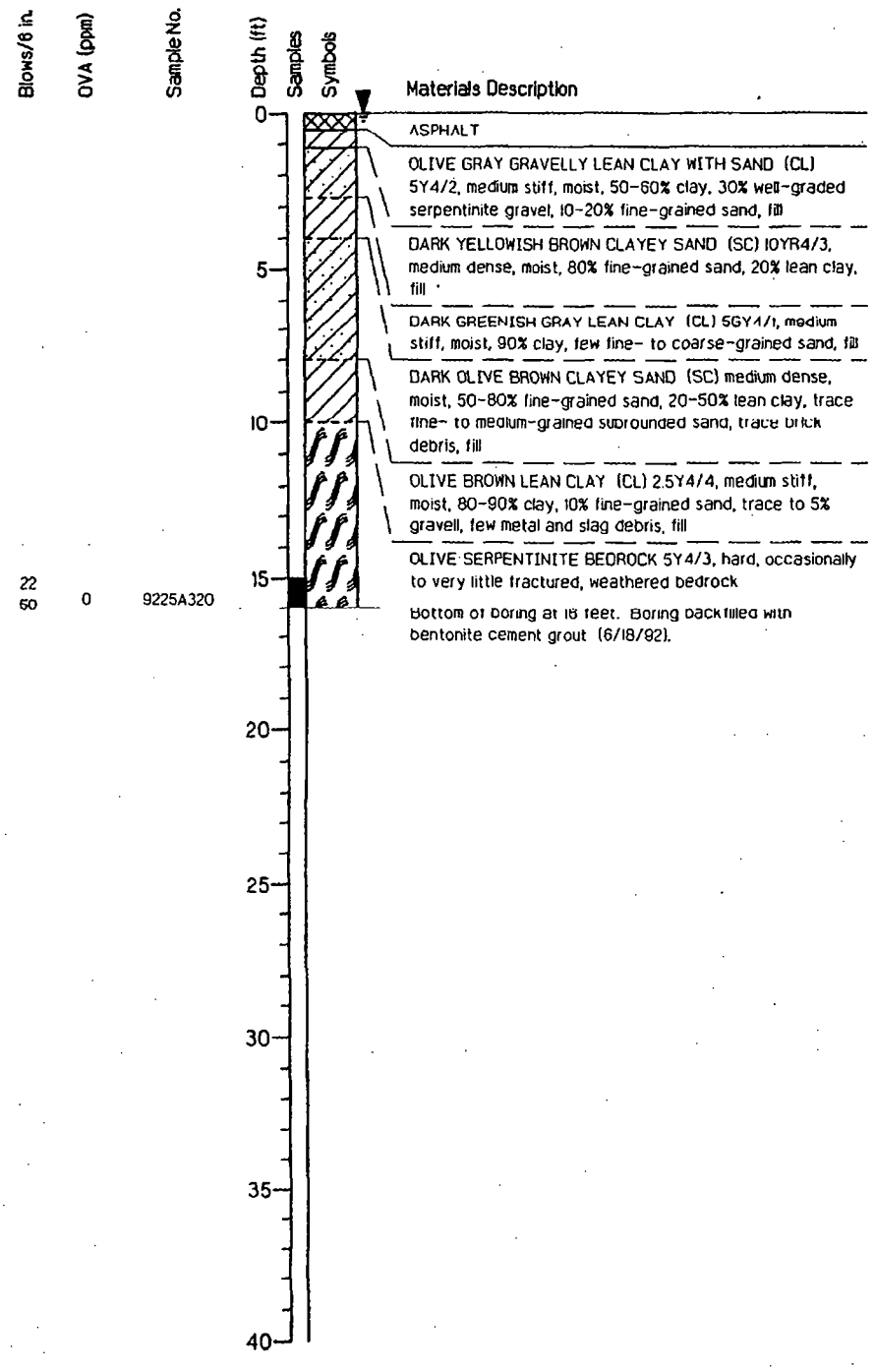
LOG OF BORING IR07B032



Project Number	Date Drilled 08/12/1991	Figure
Project Name Parcel B RI Report	GS Elevation 15.52	
Project Task Hunters Point Annex	Water Level 16.5 ft.	
Project Location San Francisco, California	Total Depth Of Hole 30 ft.	
Equipment CME 55 (HSA) 8 in. diam.		

PRC Environmental Management, Inc.
Adapted from Harding Lawson Associates

LOG OF BORING IR07B044A



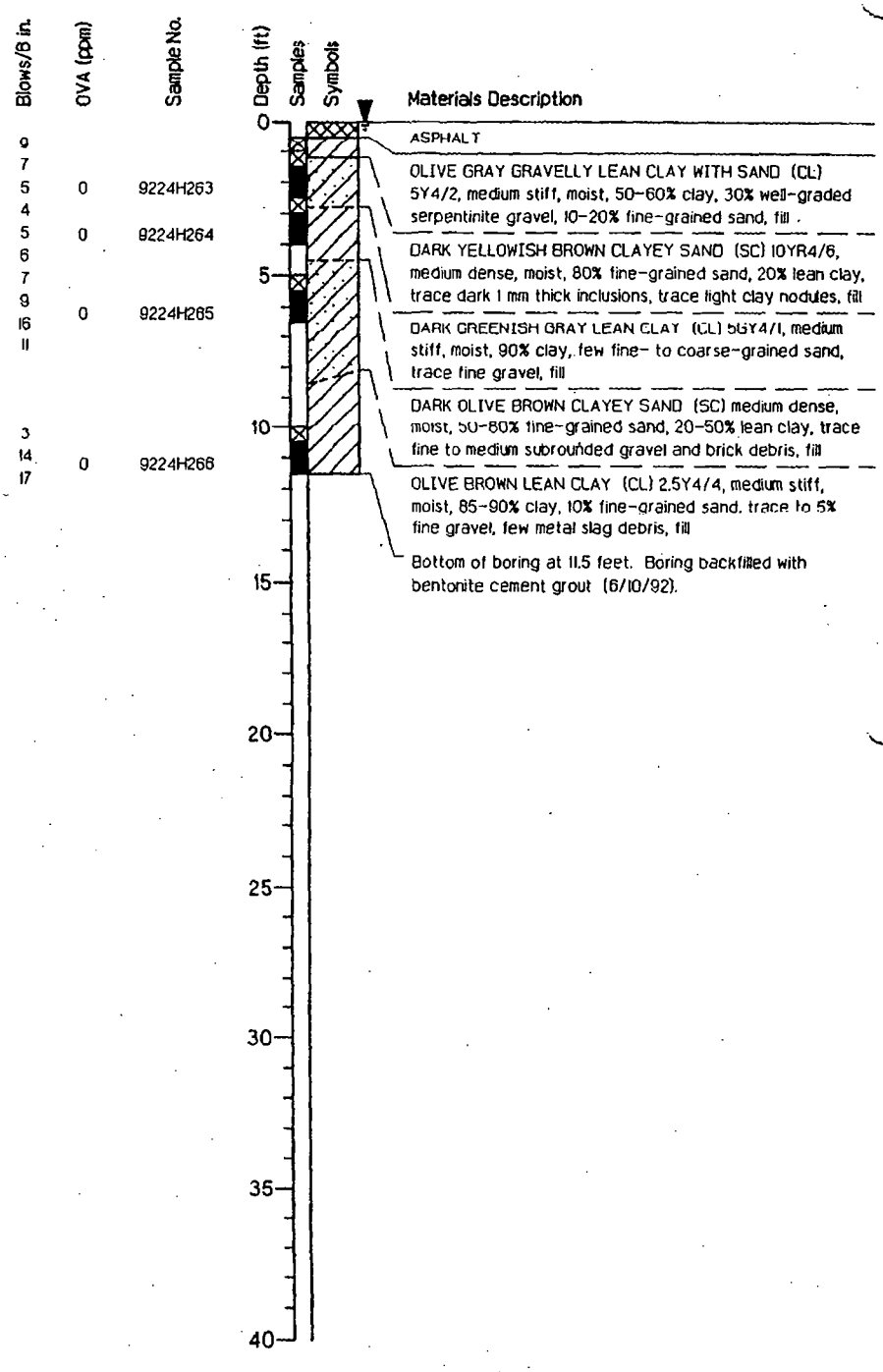
Project Number		Date Drilled	06/18/1992
Project Name	Parcel B RI Report	GS Elevation	17.79
Project Task	Hunters Point Annex	Water Level	0.0 ft.
Project Location	San Francisco, California	Total Depth Of Hole	16 ft.
Equipment	DRILL SYSTEMS 1000 (ACH) 10 in. diam.		

Figure

PRC Environmental Management, Inc.

Adapted from Harding Lawson Associates

LOG OF BORING IR07B044



Project Number _____

Project Name Parcel B RI Report

Project Task Hunters Point Annex

Project Location San Francisco, California

Equipment DRILL SYSTEMS 1000 (ACH) 10 in. diam.

Date Drilled 06/10/1992

GS Elevation 17.56

Water Level 0.0 ft.

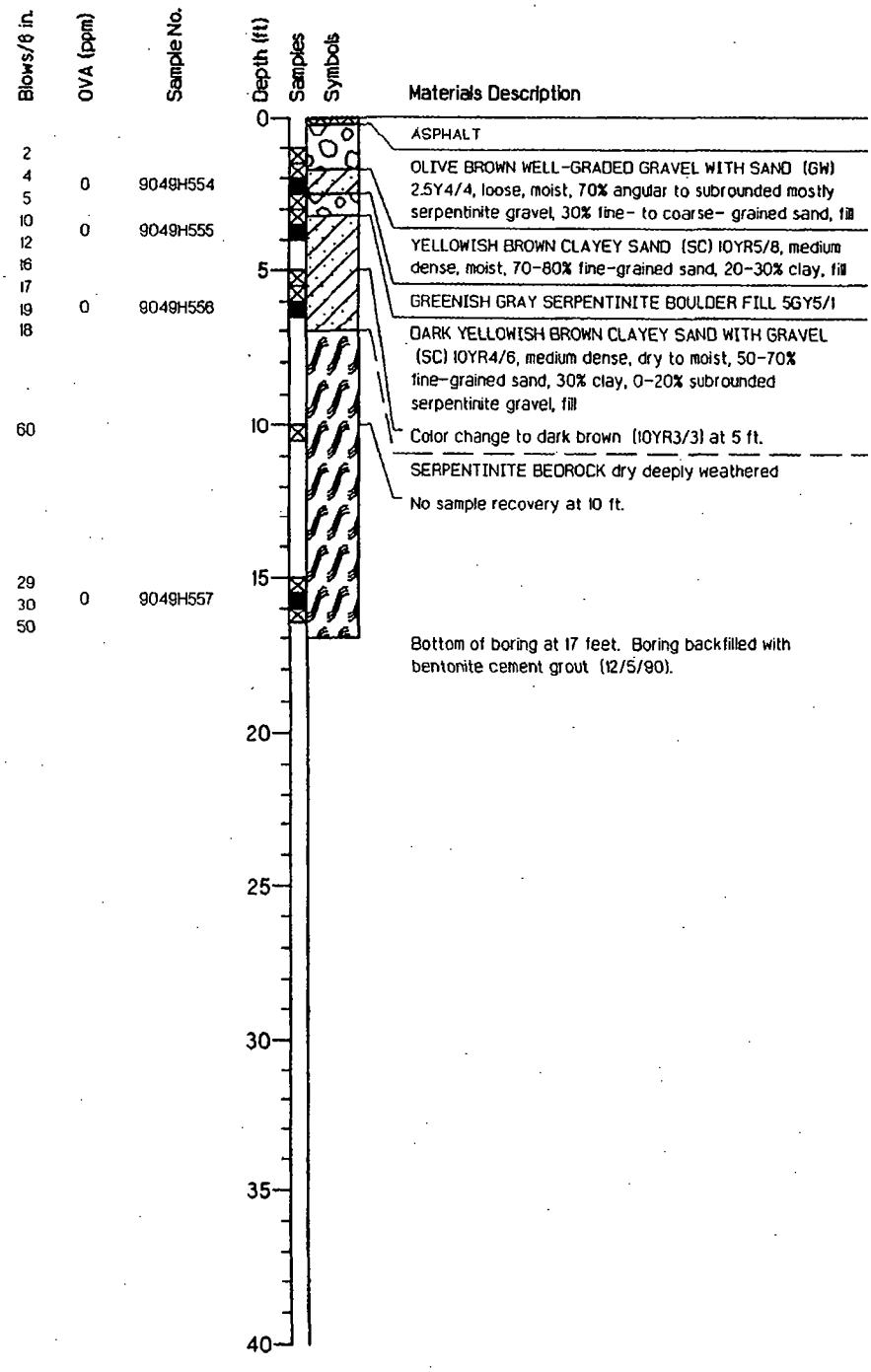
Total Depth Of Hole 11.5 ft.

Figure

PRC Environmental Management, Inc.

Adapted from Harding Lawson Associates

LOG OF BORING IR07B024



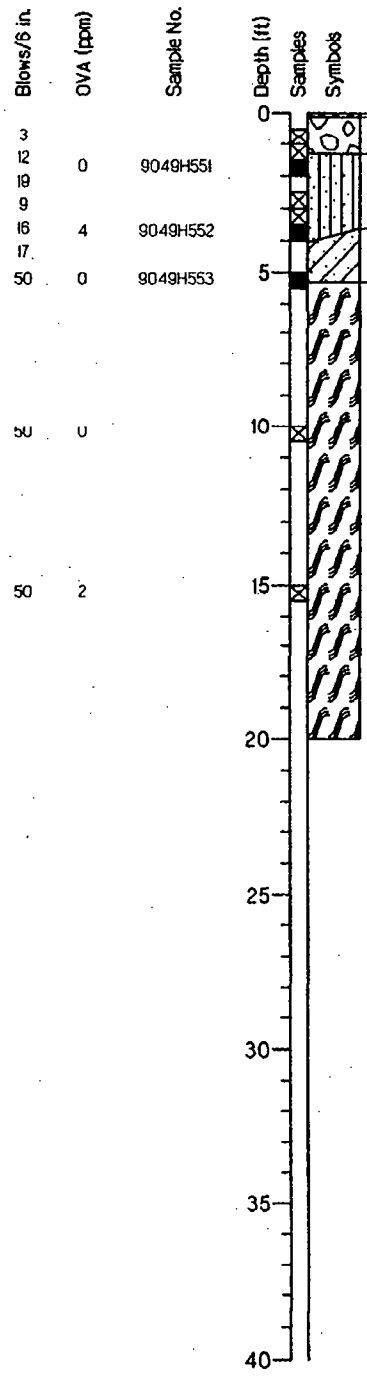
Project Number		Date Drilled	12/05/1990
Project Name	Parcel B RI Report	GS Elevation	17.85
Project Task	Hunters Point Annex	Water Level	None Encountered
Project Location	San Francisco, California	Total Depth Of Hole	17 ft.
Equipment	CME 750 (HSA) 8 in. diam.		

Figure

PRC Environmental Management, Inc.

Adapted from Harding Lawson Associates

LOG OF BORING IR07B009



Materials Description

ASPHALT

OLIVE BROWN WELL-GRADED GRAVEL WITH SAND (GW) 2.5Y4/4, loose, moist, 70% angular to subangular mostly serpentinite gravel, 30% fine- to coarse- grained sand, fill

VERY DARK GRAYISH BROWN SILTY SAND (SM) medium dense, moist, 80% fine-grained sand, 15% silt, 5% subangular to subrounded serpentinite gravel, fill

VERY DARK GRAYISH BROWN CLAYEY SAND (SC) 10YR3/2, medium dense, moist, 80-90% fine-grained sand, 10-15% clay, trace fine gravel, fill

OLIVE SERPENTINITE BEDROCK moderately fractured, deeply weathered

Bottom of boring at 20 feet. Boring backfilled with bentonite cement grout (12/4/90).

Project Number _____
Project Name Parcel B RI Report
Project Task Hunters Point Annex
Project Location San Francisco, California
Equipment CME 750 (HSA) 8 in. diam.

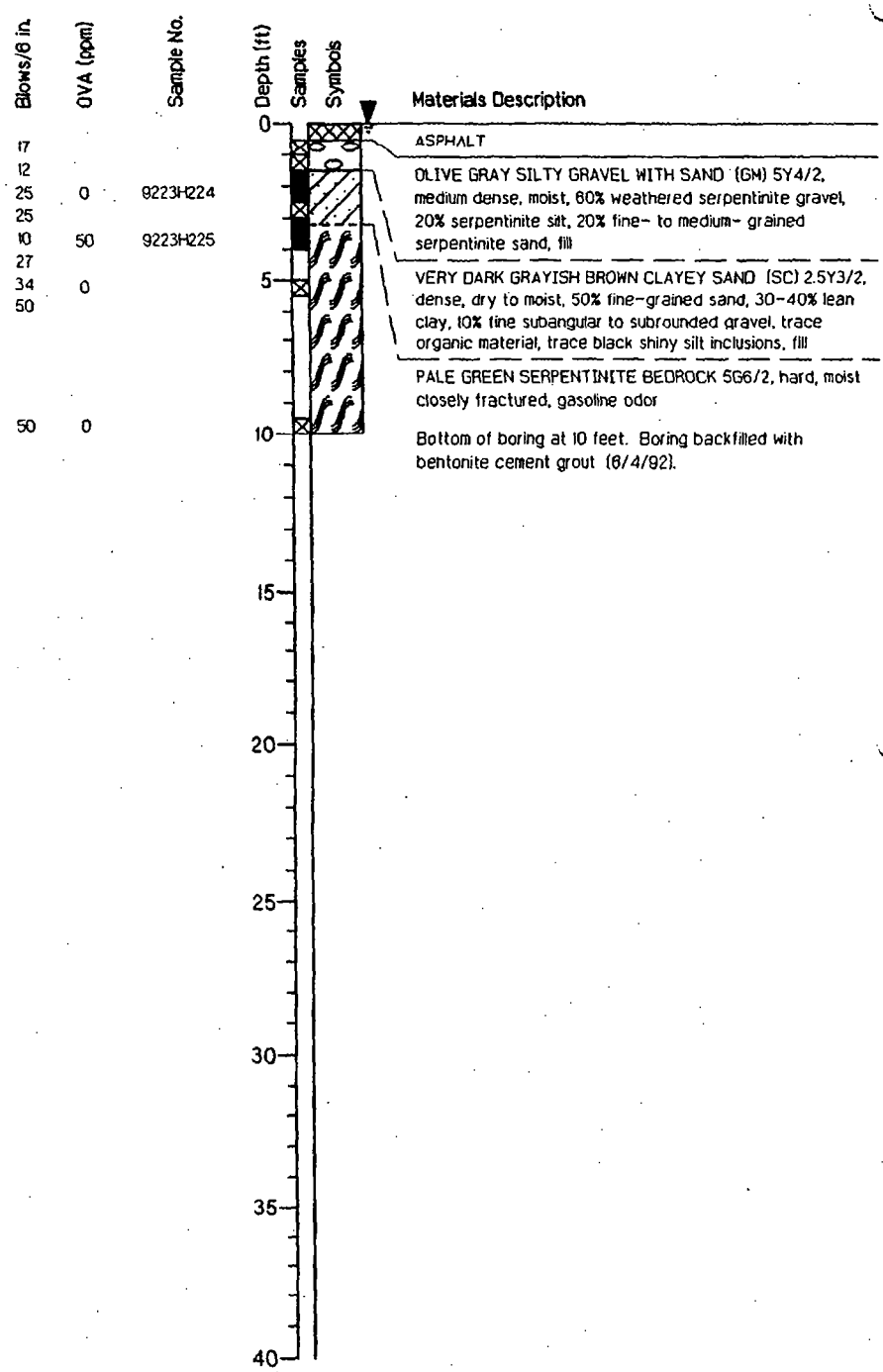
Date Drilled 12/04/1990
GS Elevation 19.29
Water Level None Encountered
Total Depth Of Hole 20 ft.

Figure

PRC Environmental Management, Inc.

Adapted from Harding Lawson Associates

LOG OF BORING IR07B038

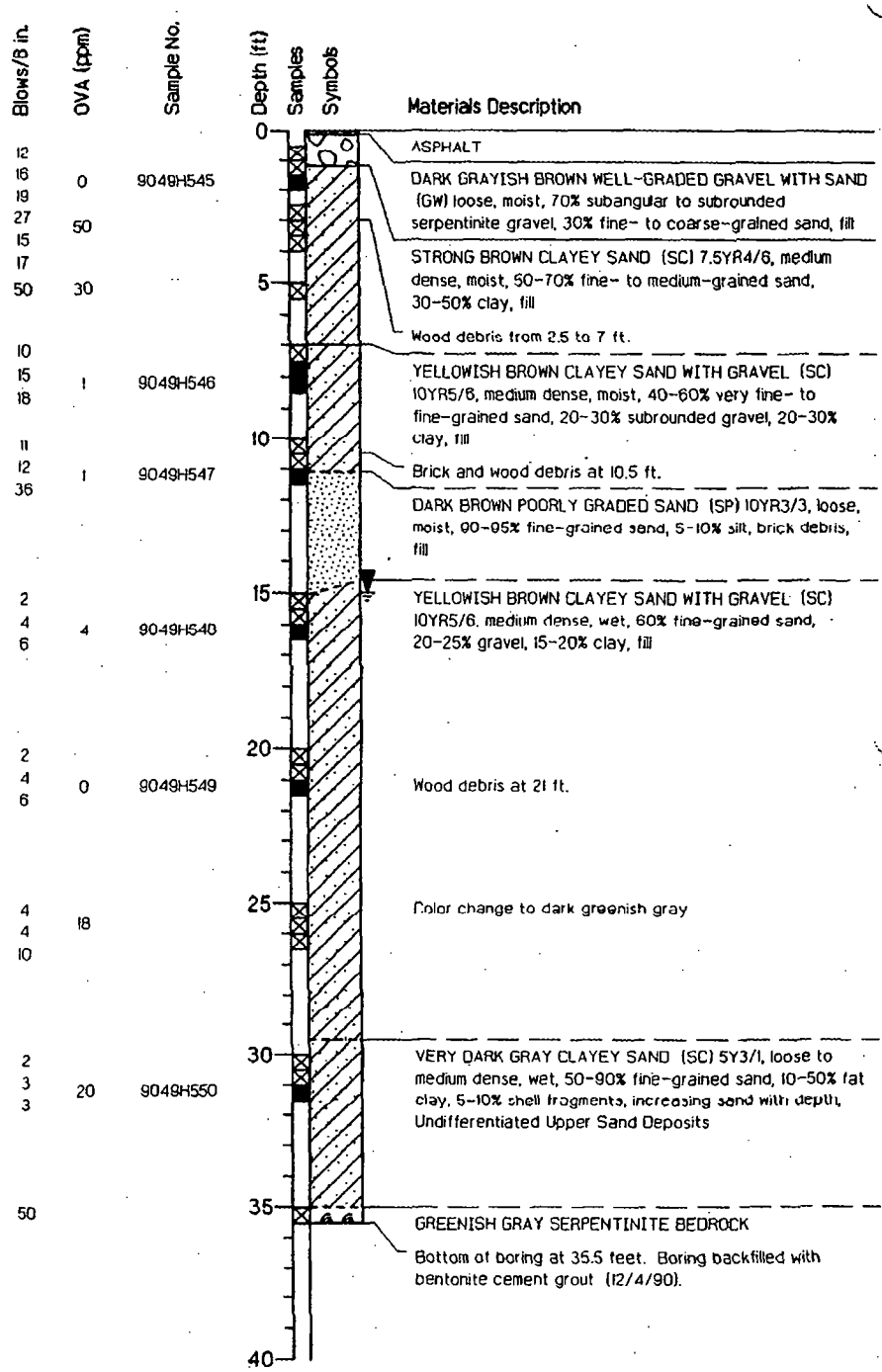


Project Number		Date Drilled	06/04/1992
Project Name	Parcel B RI Report	GS Elevation	18.60
Project Task	Hunters Point Annex	Water Level	0.0 ft.
Project Location	San Francisco, California	Total Depth Of Hole	10 ft.
Equipment	DRILL SYSTEMS 1000 (ACH) 10 in. diam.		

Figure

PRC Environmental Management, Inc.
Adapted from Harding Lawson Associates

LOG OF BORING IR07B010

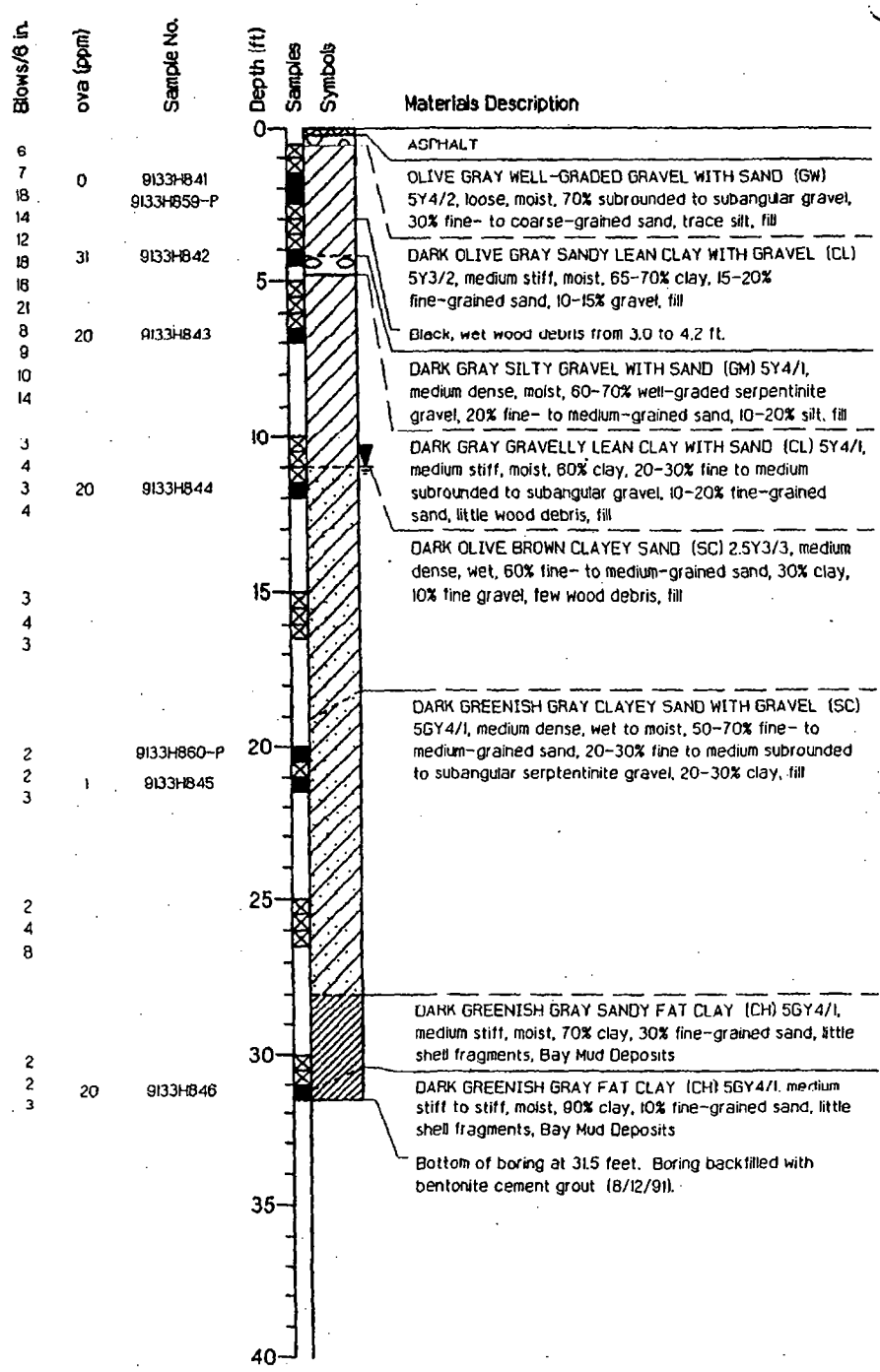


Project Number		**Date Drilled**	10/04/1990
Project Name	Parcel B RI Report	**GS Elevation**	14.65
Project Task	Hunters Point Annex	**Water Level**	15 ft.
Project Location	San Francisco, California	**Total Depth Of Hole**	35.5 ft.
Equipment	CME 750 (HSA) 8 in. diam.		

Figure

PRC Environmental Management, Inc.
Adapted from Harding Lawson Associates

LOG OF BORING IR07B033

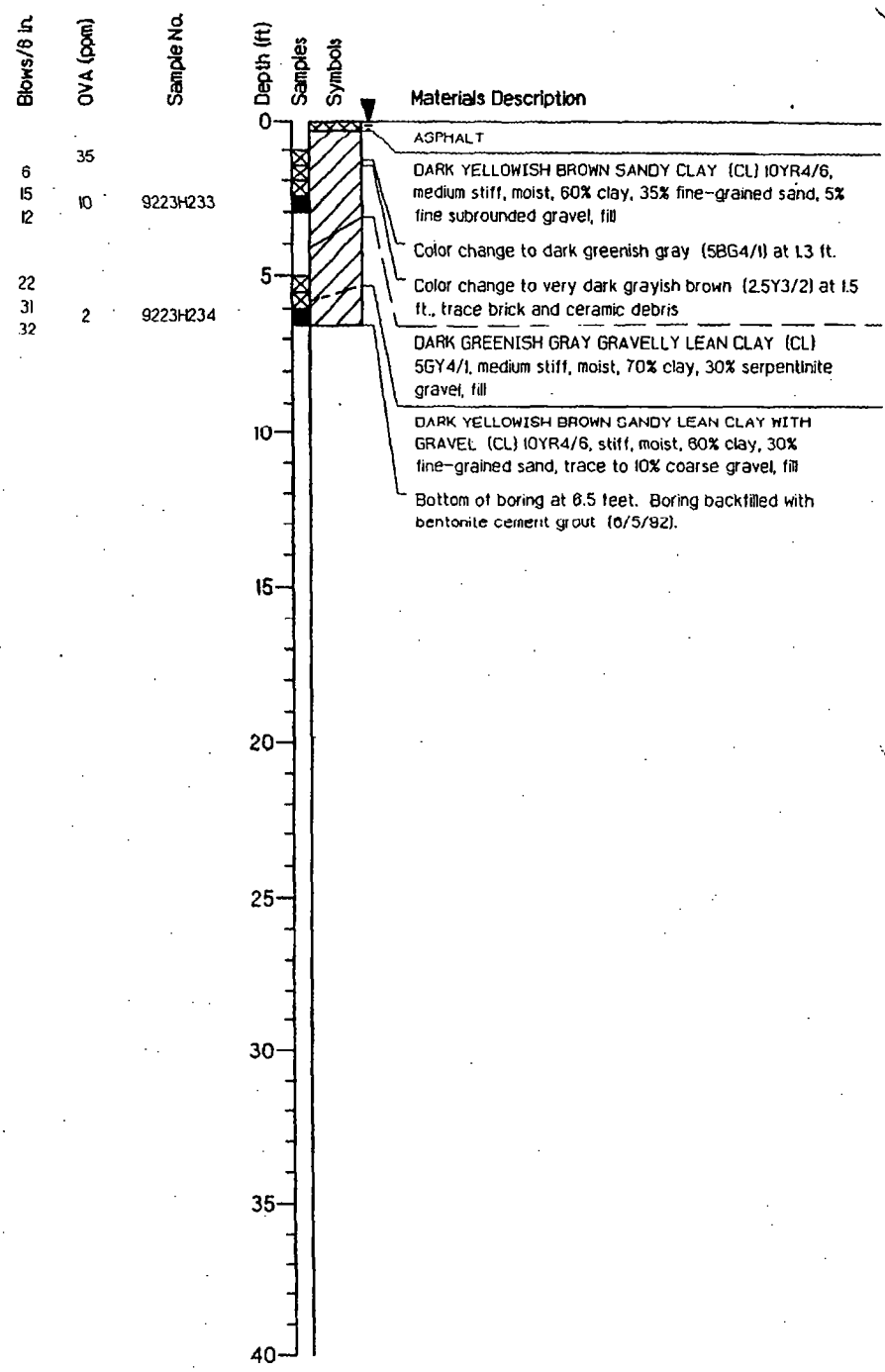


Project Number		Date Drilled	08/12/1991
Project Name	Parcel B RI Report	GS Elevation	14.18
Project Task	Hunters Point Annex	Water Level	11 ft.
Project Location	San Francisco, California	Total Depth Of Hole	31.5 ft.
Equipment	CME 55 (HSA) 8 in. diam.		

Figure

PRC Environmental Management, Inc.
Adapted from Harding Lawson Associates

LOG OF BORING IR07B045

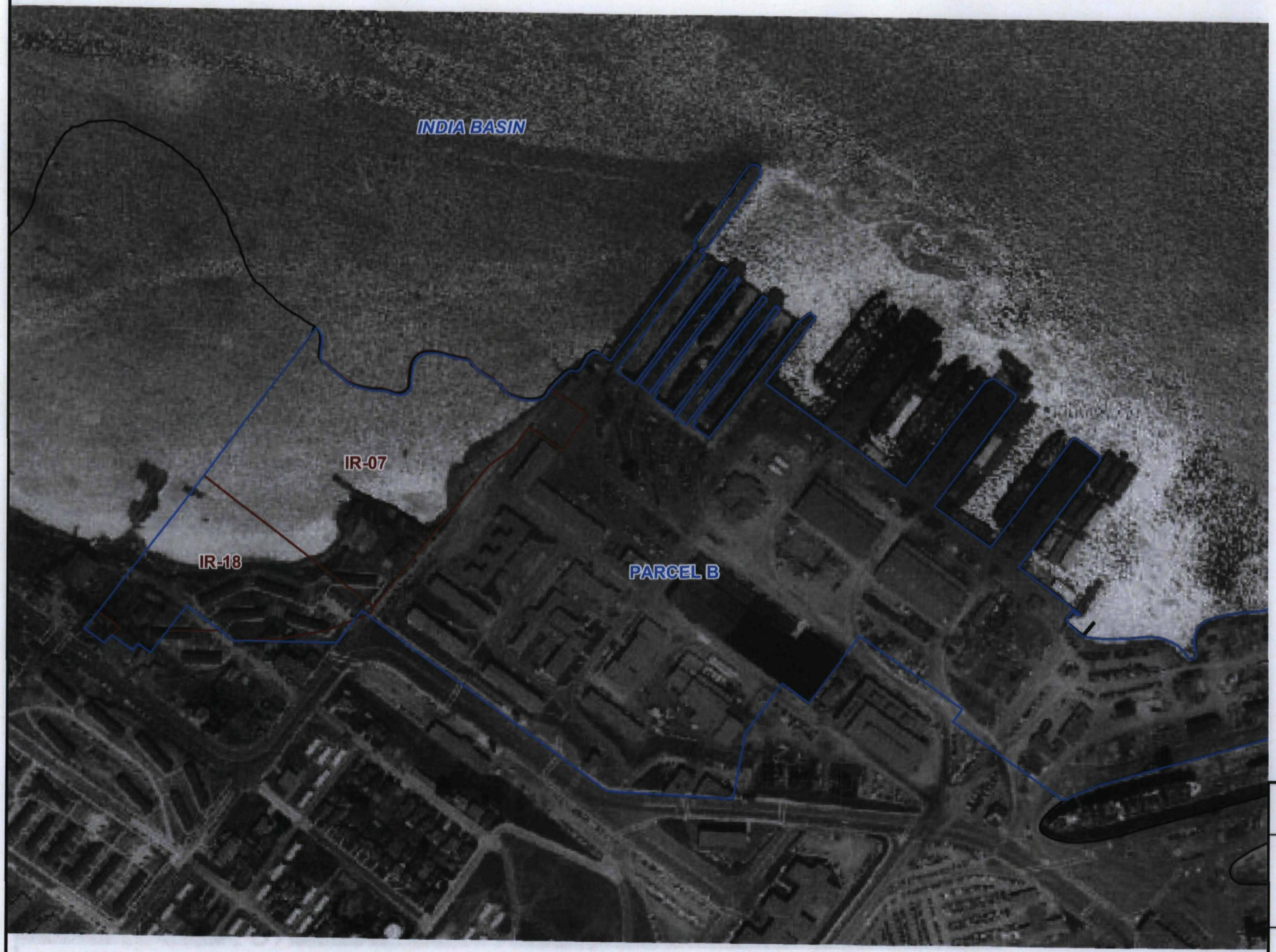


Project Number		Date Drilled	06/05/1992
Project Name	Parcel B RI Report	GS Elevation	14.76
Project Task	Hunters Point Annex	Water Level	0.0 ft.
Project Location	San Francisco, California	Total Depth Of Hole	6.5 ft.
Equipment	DRILL SYSTEMS 1000 (ACH) 10 in. diam.		

Figure

ATTACHMENT 3

AERIAL PHOTOGRAPHS



LEGEND

- PARCEL B BOUNDARY
- INSTALLATION RESTORATION SITE BOUNDARY
- COAST

150 0 150 300 Feet

Scale: 1" = 300'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA, TIME-CRITICAL REMOVAL ACTION

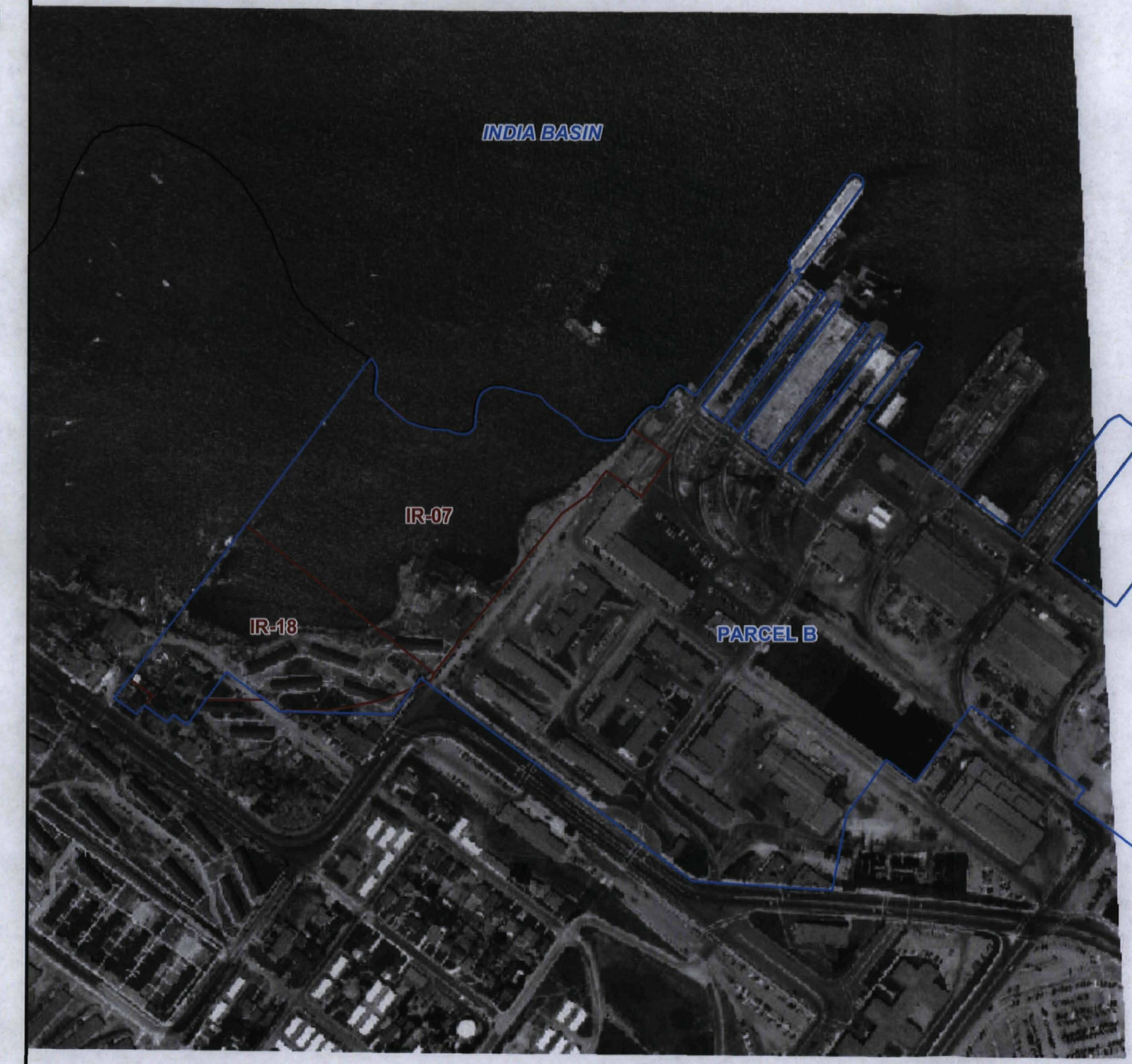
FIGURE 1

ATTACHMENT 3 - 1946 AERIAL PHOTOGRAPH

HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-0017
FILE NUMBER: SEST16L2915.mxd

SES-TECH



LEGEND

- PARCEL B BOUNDARY
- INSTALLATION RESTORATION SITE BOUNDARY
- COAST

150 0 150 300 Feet

Scale: 1" = 300'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA, TIME-CRITICAL REMOVAL ACTION

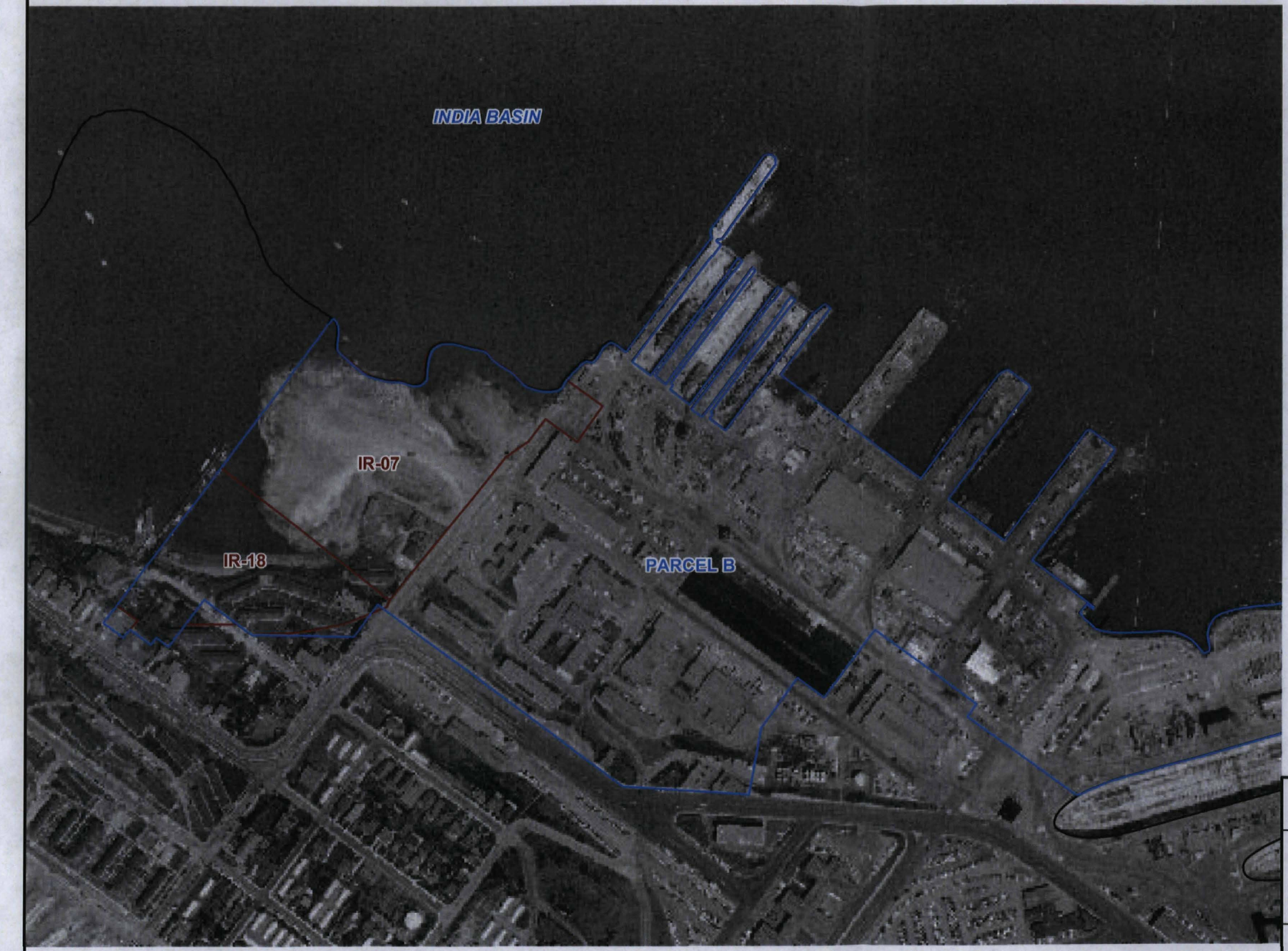
FIGURE 2

ATTACHMENT 3 - 1948 AERIAL PHOTOGRAPH

HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-0017
FILE NUMBER: SEST16L2916.mxd

SES-TECH



LEGEND

- PARCEL B BOUNDARY
- INSTALLATION RESTORATION SITE BOUNDARY
- COAST

150 0 150 300 Feet

Scale: 1" = 300'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA, TIME-CRITICAL REMOVAL ACTION

FIGURE 3

ATTACHMENT 3 - 1955 AERIAL PHOTOGRAPH

HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-0017
FILE NUMBER: SEST16L2917.mxd

SES-TECH

LEGEND

- PARCEL B BOUNDARY
- INSTALLATION RESTORATION SITE BOUNDARY
- COAST

150 0 150 300 Feet

Scale: 1" = 300'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA, TIME-CRITICAL REMOVAL ACTION

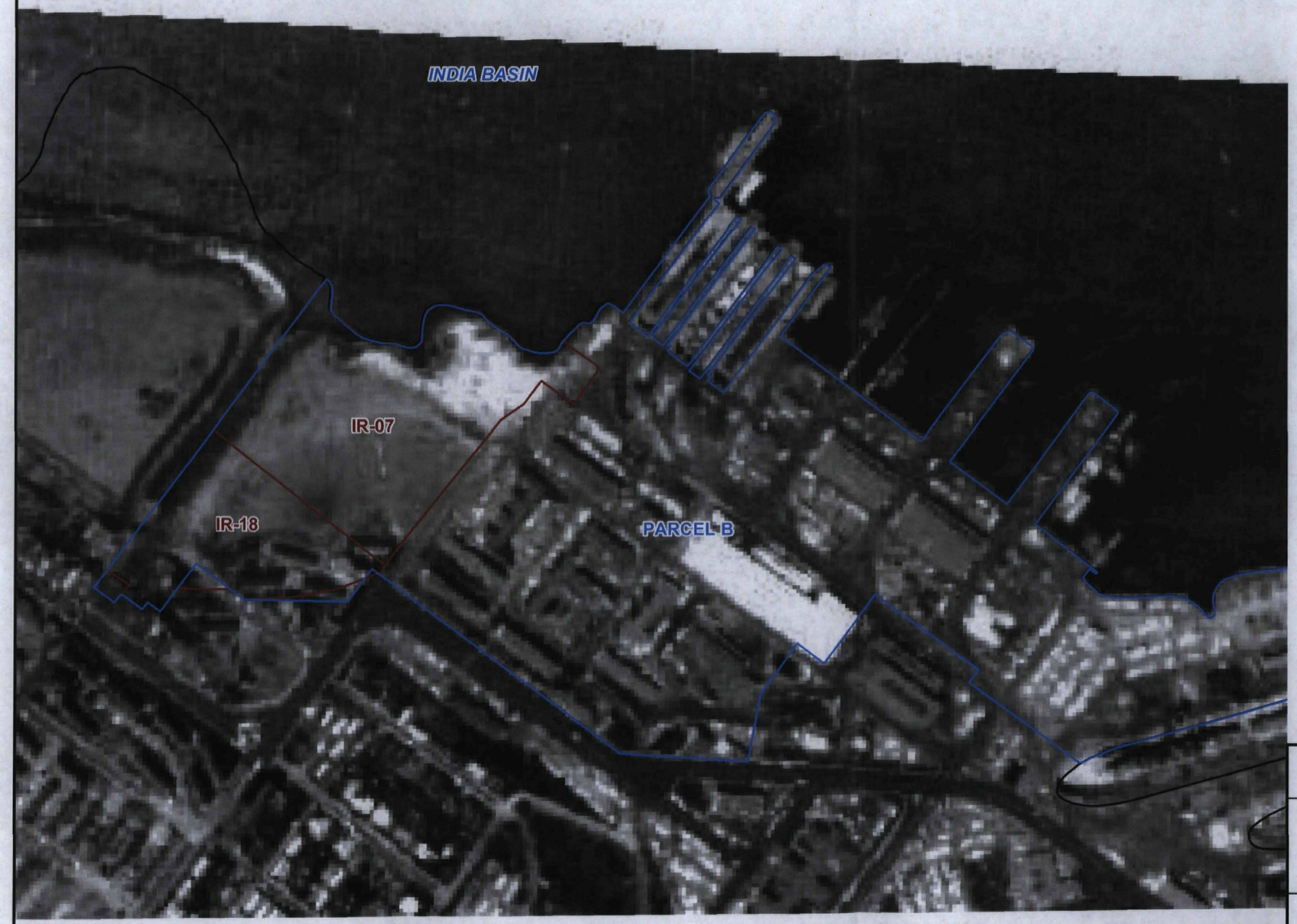
FIGURE 4

ATTACHMENT 4 - 1961 AERIAL PHOTOGRAPH

HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-0017
FILE NUMBER: SEST16L3143.mxd

SES-TECH



LEGEND

- PARCEL B BOUNDARY
- INSTALLATION RESTORATION SITE BOUNDARY
- COAST

150 0 150 300 Feet

Scale: 1" = 300'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA, TIME-CRITICAL REMOVAL ACTION

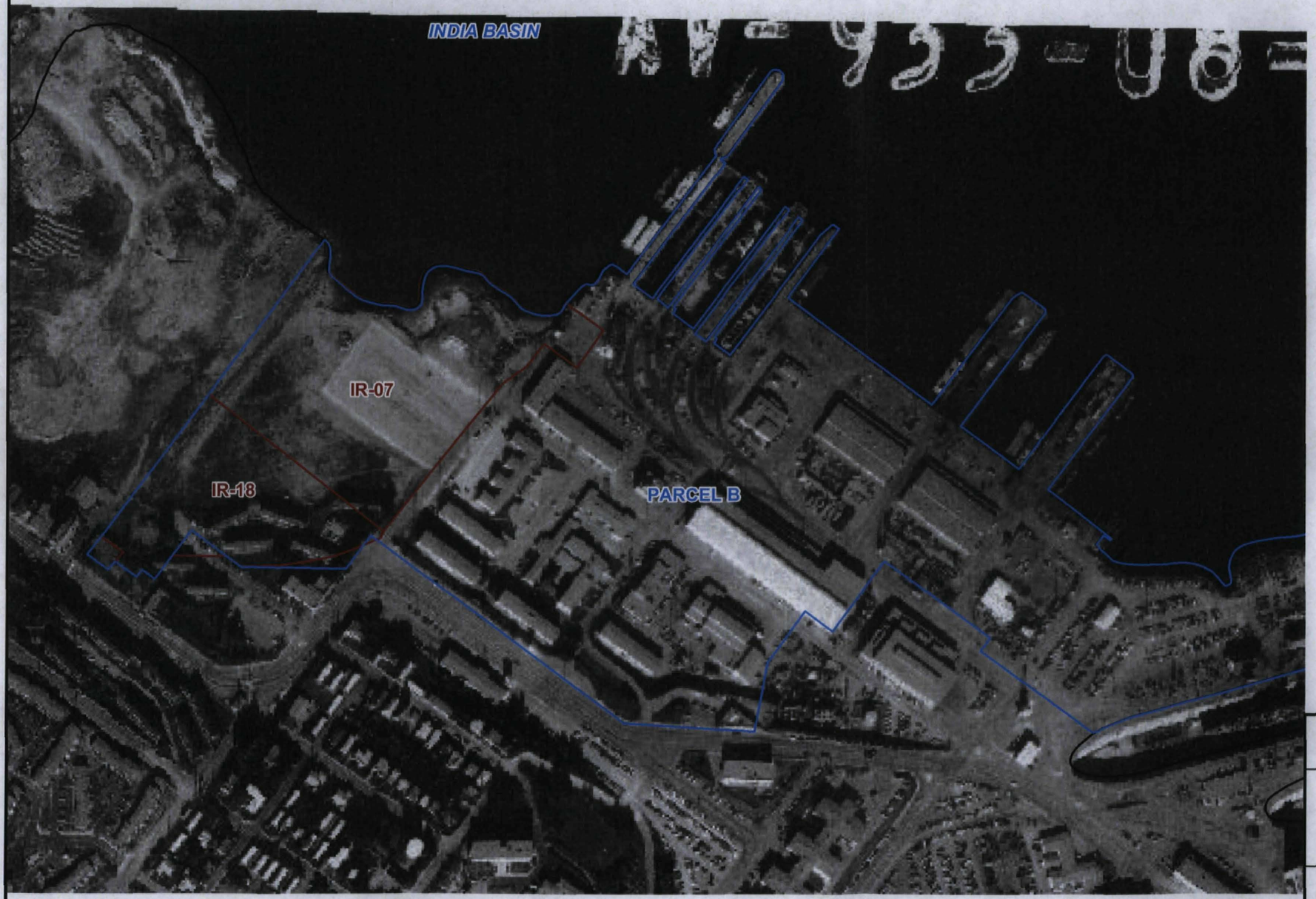
FIGURE 5

ATTACHMENT 5 - 1963 AERIAL PHOTOGRAPH

HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-0017
FILE NUMBER: SEST16L3144.mxd

SES-TECH



LEGEND

- PARCEL B BOUNDARY
- INSTALLATION RESTORATION SITE BOUNDARY
- COAST

150 0 150 300 Feet

Scale: 1" = 300'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA, TIME-CRITICAL REMOVAL ACTION

FIGURE 6

ATTACHMENT 6 - 1969 AERIAL PHOTOGRAPH

HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-0017
FILE NUMBER: SEST16L3145.mxd

SES-TECH

LEGEND

- PARCEL B BOUNDARY
- INSTALLATION RESTORATION SITE BOUNDARY
- COAST

150 0 150 300 Feet

Scale: 1" = 300'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL WORK PLAN, HUNTERS POINT SHIPYARD, PARCEL B,
METHANE SOURCE AREA, TIME-CRITICAL REMOVAL ACTION

FIGURE 7

ATTACHMENT 7 - 1972 AERIAL PHOTOGRAPH

HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-0017
FILE NUMBER: SEST16L3146.mxd

SES-TECH

APPENDIX A

SAMPLING AND ANALYSIS PLAN

SAP Worksheet #1 – Title and Approval Page

FINAL
SAMPLING AND ANALYSIS PLAN
(Field Sampling Plan and Quality Assurance Project Plan)
August 2008

Time-Critical Removal Action for the Methane Source Area at IR-07
Hunters Point Shipyard
San Francisco, California
Prepared for:
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108

Prepared by:
SES-TECH
1230 Columbia Street, Suite 540
San Diego, California 92101
619-546-7208

Prepared under:
Contract No. N62473-07-D-3220
CTO No. 0002
DCN: SEST-3220-0002-0017

Review Signature: Mary Schneider — 8/4/08

Mary Schneider
Quality Control Manager — Date

Approval Signature: Narciso A. Ancog — 8/5/2008

Narciso A. Ancog
NAVFAC SW Quality Assurance Officer — Date

EXECUTIVE SUMMARY

This Sampling and Analysis Plan (SAP) has been prepared by SES-TECH, a joint venture between Sealaska Environmental Services, LLC (SES) and Tetra Tech EC, Inc. (TtEC) to support the time-critical removal action (TCRA) for the methane source area at Installation Restoration (IR) Site 07 (IR-07) at Hunters Point Shipyard (HPS) in San Francisco, California. This SAP is being prepared under the Naval Facilities Engineering Command, Southwest Small Business Performance-Based Environmental Multiple Award Contract No. N62473-07-D-3220, Contract Task Order 0002.

The purpose of this SAP is to provide guidance on sampling, analysis, and quality assurance developed to acquire the data necessary to support the TCRA at IR-07. This SAP will be used as a reference document by all field and laboratory personnel engaged in the sampling and analysis for this project. This SAP is prepared in accordance with the requirements of the Uniform Federal Policy for Quality Assurance Project Plans (Environmental Protection Agency [EPA], 2005) and the EPA Guidance for Quality Assurance Project Plans (EPA, 2002).

A soil gas survey conducted at IR-07 in 2005 reported methane as high as 17 percent by volume in a small area. The soil gas investigation data were used as the basis for determining the preliminary extent of the methane source area for this removal action. The primary objective of this TCRA is to remove methane in soil gas and its source material from IR-07 to eliminate possible threats to public welfare now and in the future. To achieve the objectives of this TCRA, up to ten (10) temporary soil gas probes will be installed to refine the current extent of methane in soil gas. After soil gas probes are installed, methane, carbon dioxide, oxygen, temperature and barometric pressure will be measured using a GEM^{TM} 2000 and total volatile organic compounds using a photoionization detector.

Following the soil gas sampling activities, up to four borings will be advanced using direct-push technology to approximately 25 feet below ground surface bgs. Continuous cores will be collected at each location, followed by installation of temporary groundwater monitoring wells. In situ groundwater samples will be collected and analyzed for dissolved methane. Dissolved methane analytical results and groundwater sampling parameters (dissolved oxygen and oxidation-reduction potential) will be used to help identify potential methane source areas.

Once the extent of the methane-producing waste has been evaluated using soil, soil gas, and groundwater analyses, the removal action excavation boundary will be finalized, and

excavation will commence. Excavated material will be screened for radiological contamination by TtEC, the base radiological subcontractor.

The excavation will be backfilled with available clean backfill material on-site. Five permanent soil gas probes will be installed within the excavation area after the removal action is complete. Permanent soil gas probes will be installed and methane will be measured using the GEM™ 2000 at each soil gas probe once immediately following installation.

The laboratory will submit hardcopy and electronic data. Ninety percent of the data will be validated as EPA Level III and 10 percent as EPA Level IV by a third party validator. The data usability assessment will be performed by a team of personnel at SES-TECH after data validation report is received. Final assessed data will be included in a Removal Action Closeout Report. The electronic data in Navy Electronic Data Deliverable format will be submitted to the Department of Navy (DON) 30 calendar days after the validation report is received.

The TCRA will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act. Oversight will be provided by the HPS Base Closure Team (BCT). The BCT comprises the DON, EPA, California Environmental Protection Agency Department of Toxic Substances Control, and the San Francisco Regional Water Quality Control Board. The DON is the lead agency responsible for the TCRA.

TABLE OF CONTENTS

SAP Worksheets

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
%D	percent difference
%R	percent recovery
ASTM	American Society for Testing and Materials
BCT	BRAC Cleanup Team
bgs	below ground surface
BHC	benzene hexachloride
°C	degrees Celsius
CAS	Chemical Abstracts Service
CCV	continuing calibration verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chain-of-custody
COD	chemical oxygen demand
CSO	Site Office Caretaker
CTO	Contract Task Order
DCN	document control number
DDD	dichlorodiphenyldichoroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
DON	Department of the Navy
DQI	data quality indicator
DQO	data quality objective
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FCR	Field Change Request

ABBREVIATIONS AND ACRONYMS (Continued)

FID	flame ionization detector
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
HCl	hydrochloric acid
HNO_3	nitric acid
H_2SO_4	sulfuric acid
HPS	Hunters Point Shipyard
ICAL	initial calibration
ICP	inductively coupled argon plasma
ICV	initial calibration verification
IDL	instrument detection limit
IR	Installation Restoration (Program)
ITSI	Innovative Technical Solutions, Inc.
L	liter
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
mg	milligram
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
ml	milliliter
MCPA	2-methyl-4-chlorophenoxyacetic acid
MCPP	2-(2-methyl-4-chlorophenoxy)-propionic acid
MDL	method detection limit
MS/MSD	matrix spike/matrix spike duplicate
NaOH	sodium hydroxide
NAVFAC SW	Naval Facilities Engineering Command Southwest
NE	not established
NEDD	Navy Electronic Data Deliverable

ABBREVIATIONS AND ACRONYMS (Continued)

NIRIS	Navy Installation Restoration Information Solution
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCB	polychlorinated biphenyl
PjM	Project Manager
PID	photoionization detector
PQO	project quality objective
psig	pounds per square inch guage
PT	precision test
QA	quality assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
QCM	Quality Control Manager
QL	quantitation limit
QSM	Quality Systems Manual
RASO	Radiological Affairs Support Office
RF	radio frequency
ROICC	Resident Officer in Charge of Construction
RPD	relative percent difference
RPM	Remedial Project Manager
RSD	relative standard deviation
SAP	Sampling and Analysis Plan
SDG	sample delivery group
SES	Sealaska Environmental Services, LLC
SOP	Standard Operating Procedure
SVOC	semivolatile organic compound
TBD	to be determined

ABBREVIATIONS AND ACRONYMS (Continued)

TCLP	toxicity characteric leaching procedure
TCRA	Time-Critical Removal Action
TO	toxic organics
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
TSS	total suspended solid
TtEC	Tetra Tech EC
TTLC	total threshold limit concentration
UFP	Uniform Federal Policy
USACE	United States Army Corps of Engineers
v/v	volume per volume
VOA	volatile organic analysis
VOC	volatile organic compound
Water Board	Regional Water Quality Control Board

SAP Worksheet #2 – SAP Identifying Information

Site Name/Number:	IR Site 07
Operable Unit:	Parcel B
Contractor Name:	SES-TECH
Contract Number:	N62473-07-D-3220
Contract Title:	Small Business Performance-Based Environmental Multiple Award Contract

1. This SAP was prepared in accordance with the requirements of the *Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP)* (EPA 2005) and *EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS (EPA 2002)*

2. Identify regulatory program: CERCLA

3. This SAP is a project-specific SAP.

4. List dates of scoping sessions that were held:

Scoping Session	Date
Pre-proposal on-site meeting was held with NAVFAC Southwest.	10/25/07

5. List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation.

Title	Date
Final Sampling and Analysis Plan, Appendix A of the Final Soil	03/15/05
Gas Survey Work Plan (DCN: SES-TECH-05-0027)	

6. List organizational partners (stakeholders) and connection with lead Members of the Base Closure Team (BCT) including EPA, DTSC,

7. Lead organization:
NAVFAC Southwest

8. If any required SAP elements or required information are not applicable to the Project or are provided elsewhere, then note the omitted SAP elements and Provide an explanation for their exclusion below:
Secondary data were not used in developing this SAP. Therefore, Worksheet #13 is not required. Sampling SOPs will not be used for this project. Step-by-step procedures are included within Worksheet #14.

SAP Worksheet #2 – SAP Identifying Information (Continued)

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related information
A. Project Management		
Documentation		
1.	Title and Approval Page	
2.	Table of Contents.	
	SAP Identifying Information	
3.	Distribution List	
4.	Project Personnel Sign-Off Sheet	
Project Organization		
5.	Project Organizational Chart	
6.	Communication Pathways	
7.	Personnel Responsibilities and Qualifications Table	
8.	Special Personnel Training	
Project Planning/ Problem Definition		
9.	Project Planning Session Documentation (including Data Needs table) Project Scoping Session Participants Sheet	
10.	Problem Definition, Site History, and Background.	
	Site Maps (historical and present)	
11.	Site-Specific Project Quality Objectives	
12.	Measurement Performance Criteria Table	
13.	Sources of Secondary Data and Information Secondary Data Criteria and Limitations Table	Not available because secondary data was not used in developing this SAP
14.	Summary of Project Tasks	
15.	Reference Limits and Evaluation Table	
16.	Project Schedule/Timeline Table	
B. Measurement Data Acquisition		
Sampling Tasks		
17.	Sampling Design and Rationale	
18.	Sampling Locations and Methods/SOP Requirements Table. Sample Location Map(s)	
19.	Analytical Methods/SOP Requirements Table	
20.	Analytical Methods/SOP Requirements Table	
21.	Project Sampling SOP References Table Sampling SOPs	Step–by-step sampling procedures are included within Worksheet #14.
22.	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	
Analytical Tasks		
23.	Analytical SOPs Analytical SOP References Table	
24.	Analytical Instrument Calibration Table	
25.	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	

SAP Worksheet #2 – SAP Identifying Information (Continued)

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related information
Sample Collection		
26.	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	
27.	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	
Quality Control Samples		
28.	QC Samples Table Screening/Confirmatory Analysis Decision Tree	
Data Management Tasks		
29.	Project Documents and Records Table	
30.	Analytical Services Table Analytical and Data Management SOPs	
C. Assessment Oversight		
31.	Planned Project Assessments Table Audit Checklists	
32.	Assessment Findings and Corrective Action Responses Table	
33.	QA Management Reports Table	
D. Data Review		
34.	Verification (Step I) Process Table	
35.	Validation (Steps IIa and IIb) Process Table	
36.	Validation (Steps IIs and IIb) Summary Table	
37.	Usability Assessment	

SAP Worksheet #3 – Distribution List

Name of SAP Recipients	Title/Role	Organization	Telephone Number	E-mail Address or Mailing Address
Melanie Kito	Lead Remedial Project Manager	NAVFAC SW	(619) 532-0787	melanie.kito@navy.mil
Lara Urizar	Remedial Project Manager	NAVFAV SW	(619) 532- 0960	lara.urizar.ctr@navy.mil
Narciso Ancog	Quality Assurance Officer	NAVFAC SW	(619) 532-3046	narciso.ancog@navy.mil
Diane Silva	Administrative Record Manager	NAVFAC SW	(619) 532-3676	diane.silva@navy.mil
Laurie Lowman	Radiological Site Manager	RASO	(757) 887-4692	laurie.lowman@navy.mil
Mark Ripperda	Remedial Project Manager	EPA	(415) 972-3028	ripperda.mark@epamail.epa.gov
Tom Lanphar	Remedial Project Manager	Cal/EPA DTSC	(510) 540-3776	tlanphar@dtsc.ca.gov
Erich Simon	Remedial Project Manager	Water Board	(510)-622-2235	ersimon@waterboards.ca.gov
Peter Stroganoff	ROICC	NAVFAC SW	(510) 749-5941	peter.stroganoff@navy.mil
Mike Mentink	CSO	CSO HPS	(415) 743-4729	mike.mentink@navy.mil
Mary Schneider	Quality Control Manager	SES	(619) 532-0474	mary.schneider@sealaska.com
Ryan Ahlersmeyer	Project Manager	SES	(619) 255-6173	ryan.ahlersmeyer@sealaska.com
William Dougherty	Project Manager	Tetra Tech EC, Inc.	(415) 216-3731	bill.dougherty@tteci.com
Lesley Wise	Project Manager	Environmental Analytical Services, Inc.	(805) 781-3585	lwise@easlab.com

Name of SAP Recipients	Title/Role	Organization	Telephone Number	E-mail Address or Mailing Address
Richard Beauvil	Project Manager	EMAX Laboratories	(310) 618-8889	rbeauvil@emaxlabs.com
Linda Rauto	Project Manager	Laboratory Data Consultants, Inc.	(760) 634-0437	lrauto@lab-data.com

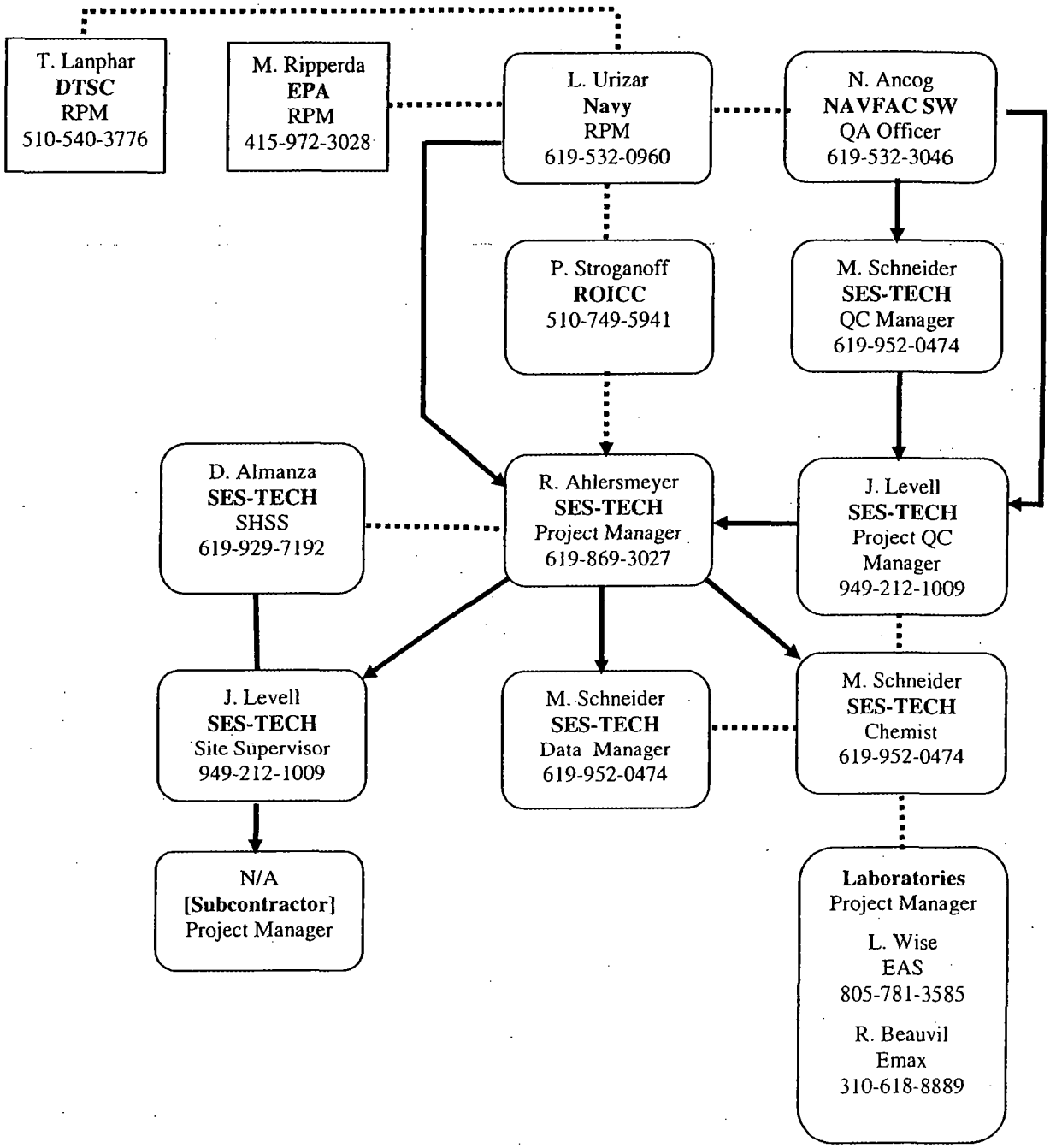
SAP Worksheet #4 – Project Personnel Sign-Off Sheet

Sampling personnel will be required to read and understand the SAP prior to any sample collection activities. Any on-site personnel conducting sampling will sign below to indicate that they have read the SAP and will perform the task as described. The signed worksheet will be maintained in the project file.

Name	Organization/Title/Role	Signature/E-mail Receipt	SAP Section Reviewed	Date SAP Read
Joe Levell	SES-TECH/ Project Quality Control Manager		Entire SAP	
Diego Almanza	SES-TECH/ Sampling Personnel		Entire SAP	
Lesley Wise	Project Manager/Environmental Analytical Services, Inc.		Entire SAP	
Richard Beauvil	Project Manager/ EMAX Laboratories		Entire SAP	
Linda Rauto	Laboroatory Data Consultants, Inc.		Entire SAP	

SAP Worksheet #5 – Project Organizational Chart

Lines of Authority ——— ····· Lines of Communication



SAP Worksheet #6 – Communication Pathways

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or E-mail	Procedure
Point of contact for DON quality issues	NAVFAC SW QAO	Narciso Ancog	(619) 532-3046	QAO will review and approve this SAP and all amendments to this SAP.
Project management	Project Manager	Ryan Ahlersmeyer	(619) 869-3027	Project Manager will manage field and project personnel.
Project management for DON	Navy RPM	Lara Urizar	(619) 532-0960	RPM will ensure that the project scope of work requirements are fulfilled.
Field quality control oversight	Navy ROICC	Peter Stroganoff	(510) 749-5941	Verify that all field work is completed in accordance with contract and project requirements.
SAP review	Quality Control Manager	Mary Schneider	(619) 952-0474	SAP will be reviewed by the QCM prior to submittal to the NAVFAC SW QAO.
Coordination and communication of fieldwork activities related to sampling	Sampling Personnel	Diego Almanza	(619) 929-7192	Sampling personnel will communicate relevant field information to the Project Manager and Project Chemist.
Coordination of laboratory supplies for field activities	Project Chemist	Mary Schneider	(619) 952-0474	Project Chemist will contact the laboratory to provide all necessary sample containers and appropriate shipping materials (such as coolers and bubble wrap) to be delivered on site prior to commencement of field sampling activities and throughout the course of the project.
Submittal of samples to the laboratory	Sampling Personnel	Diego Almanza	(619) 929-7192	Sampling personnel will package and ship samples in accordance with this SAP.
Daily COC reports and shipping documentation	Sampling Personnel	Diego Almanza	(619) 929-7192	COCs and shipping documentation will be submitted via fax or e-mail to the Project Chemist at the end of each day that samples are collected.
Reporting laboratory data quality issues	Laboratory Project Manager	Lesley Wise Richard Beauvil	(805) 781-3585 (310) 618-8889	All QA/QC issues will be reported by the Laboratory Project Manager to the Project Chemist in writing within 2 business days.

SAP Worksheet #6 – Communication Pathways (Continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or E-mail	Procedure
Field and analytical corrective actions	Project Chemist	Mary Schneider	(619) 952-0474	The Project Chemist will immediately notify the QCM, and Program Chemist in writing of any field or analytical procedures that were not performed in accordance with this SAP. The Project Chemist will complete documentation of the non-conformance and corrective actions to be taken. The Project Chemist will verify that the corrective actions have been implemented.
Release of analytical data	Project Chemist	Mary Schneider	(619) 952-0474	The Project Chemist will review faxed/e-mailed data to verify that data quality is met as described in this SAP prior to releasing the data. Analytical data will be released to the Project Manager (or their designee) after the Project Chemist has verified that the data are in accordance with the SAP requirements.
SAP procedure revision during field activities	Project Chemist	Mary Schneider	(619) 952-0474	The Project Chemist or their designee will prepare an FCR for any changes in sampling procedures that occur due to conditions in the field.
SAP amendments	Project Chemist	Mary Schneider	(619) 952-0474	Any changes to the SAP will require that the Project Chemist prepare an addendum that will be approved by NAVFAC SW QAO prior to any field activities.

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table

Name	Title/Role	Organizational Affiliation	Responsibilities
Narciso Ancog	Quality Assurance Officer	NAVFAC SW	Reviewing and approving SAP Providing DON oversight of SES-TECH's Quality Assurance Program Providing technical and administrative oversight of SES-TECH's surveillance audit activities Acting as Point of Contact for matters concerning quality assurance and the DON's Laboratory Quality Assurance Program Coordinating training on matters pertaining to generation and maintenance of quality of data Authorizing the suspension of project execution if quality assurance requirements are not adequately followed
Lara Urizar	Remedial Project Manager	NAVFAC SW	Performing project management for the DON Ensuring that the project scope of work requirements are fulfilled Overseeing the project cost and schedule Providing formal technical direction to the SES-TECH project team, as required Acting as lead interface with agencies
Ryan Ahlersmeyer	Project Manager	SES-TECH	Coordinating work activities of subcontractors and SES-TECH personnel and ensuring that all personnel adhere to the administrative and technical requirements of the project Monitoring and reporting the progress of work and ensuring that the project deliverables are completed on time and within project budget Monitoring the budget and schedule and notifying the client and the RPM of any changes that may require administration actions Ensuring adherence to the quality requirements of the contract, project scope of work, and the QC plans Ensuring that all work meets the requirements of the technical specifications and complies with applicable codes and regulations Ensuring that all work activities are conducted in a safe manner in accordance with the Site-specific Health and Safety Plan, USACE's *Safety and Health Requirements* (EM-385-1-1), and all applicable OSHA regulations Serving as the primary contact between the DON and SES-TECH for actions and information related to the work and including appropriate SES-TECH technical personnel in the decision-making Coordinating satisfactory resolution and completion of evaluation and acceptance report for nonconformance reports Ensuring that all technical work meets the requirements of the technical specifications and complies with applicable codes and regulations Ensuring that all work is conducted in accordance with the Work Plan

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)

Name	Title/Role	Organizational Affiliation	Responsibilities
Diego Almanza	Sampling Personnel	SES-TECH	Ensuring that all fieldwork is conducted in accordance with the SAP Providing direction to field staff and subcontractors Reporting field information to Project Manager and Project Chemist
Mary Schneider	Quality Control Manager	SES-TECH	Establishing and maintaining the Quality Program Overseeing program QC, including construction and chemical data acquisition Working directly with the PjM and the DON to ensure implementation of the Program QC Plans Acting as a focal point for coordination for quality matters across all projects and resolving quality issues Suspending project activities if quality standards are not maintained Interfacing with the DON, including NAVFAC SW QAO, on quality-related items Conducting field QC audits to ensure that project plans are being followed Performing reviews of audit and surveillance reports conducted by others Implementing DON technical direction letters related to quality topics
Mary Schneider	Project Chemist	SES-TECH	Implementing contract requirements for chemical data collection Supporting projects in chemical data collection and analysis Monitoring performance of subcontract laboratory and data validator Ensuring that sampling personnel have documented training on sampling procedures for specific project requirements Evaluating and selecting a qualified subcontract laboratory Reviewing laboratory data prior to use against requirements in this SAP Evaluating and selecting a qualified data validation subcontractor Reviewing data validation reports Preparing a data quality assessment report to ensure the quality of the data meets the intended use of the data Submitting NEDD-formatted data to the DON in accordance with the requirements set forth in Environmental Work Instruction EVR.6, *Environmental Data Management and Required Electronic Delivery Standards* (SWDIV, 2005)

SAP Worksheet #8 – Special Personnel Training Requirements Table

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records / Certificates
All fieldwork[1]	General awareness in radiation[2]	Radiological Safety Officer (or representative)	Prior to fieldwork	All project personnel working onsite	SES-TECH	Base wide radiological contractor's field office

Notes:

1 If training has been documented on recent projects (< 1 year prior), then re-training will not be required unless otherwise requested.
2 Due to the previous land use and undocumented fill activity at the site, radiation awareness training is required.

SAP Worksheet #9 – Project Scoping Session Participants Sheet

Project Name: Methane source removal Projected Date(s) of Sampling: July and August 2008 Project Manager: Ryan Ahlersmeyer, PG	Site Name: IR-07 Site Location: Hunters Point Shipyard, San Francisco
Date of Session: 10/25/07 **Scoping Session Purpose:** Define removal action approach	

Name	Title	Affiliation	Phone Number	E-Mail Address	Project Role
Melanie Kito	Lead RPM	NAVFAC SW	619-532-0787	melanie.kito@navy.mil	Lead RPM
Darren Knight	Former RPM	NAVFAC SW	619-532-0960	N/A	RPM
Ryan Ahlersmeyer	Project Manager	SES-TECH	619.255-6173	ryan.ahlersmeyer@sealaska.com	Project Manager
Pat Brooks	Former SES-TECH Program Manager	SES-TECH	619-564-8329	pat.brooks@sealaska.com	Program Manager

Comments/Decisions: Present pre-excavation and post-excavation sampling locations and rationale in Draft Work Plan and Sampling and Analysis Plan consistent with technical proposal submitted to the Navy.

Action Items: Prepare and submit Draft Work Plan and SAP.

Consensus Decisions: Collect soil, soil gas, and groundwater samples to better characterize the methane source area before excavation. Install permanent soil gas probes after excavation is complete and measure methane concentrations in soil gas.

SAP Worksheet #10 – Problem Definition

IR-07 is located in the northeast corner of Parcel B at HPS. Site 18 is usually included in the IR-07 site discussions due to similar contamination and history. Collectively, the sites are referred to as IR-07/18 and comprise approximately 17 acres. The northwestern and southwestern boundaries are adjacent to the HPS property line, San Francisco Bay is on the northeast, and IR-07/18 is adjacent to the rest of Parcel B on the southeast.

The area occupied by IR-07/18 was among the last areas in Parcel B to be created by infilling of the bay. Fill activities began after 1951 and proceeded in a northeast to southwest progression up through the late 1960s. Review of a 1955 aerial photograph shows a narrow channel separating two distinct lobes of fill material. A 1963 aerial photograph shows that most of IR-07/18 had been filled with only a narrow channel remaining at the western perimeter of IR-18. A 1972 aerial photograph shows that the remaining channel had been filled and that the area was occupied by parking and storage areas. Remediation activities conducted at IR-07/18 from 1998 to 2001 revealed that the fill consisted of debris distributed sporadically throughout the subsurface and included wood, brick, asphalt, burned wood debris, tile, wallboard, concrete, wooden pilings or telephone poles, plastic, bottles, and deposits of sandblast grit. Based on the information and observations collected during the remediation activities described above, the conceptual site model for IR-07/18 is that of a debris-fill area, wherein contamination is associated with the placement of the fill material rather than a typical point-source release.

A soil gas survey conducted at IR-07 in 2005 was designed to provide a 95 percent degree of certainty that a methane plume with a radius of 65 feet or greater would be detected. Methane in soil gas has been detected in a small area at concentrations as high as 17 percent by volume. The area of detection corresponds to a small crescent-shaped area of shoreline in a 1948 aerial photograph. The sediment in this crescent-shaped "bay" is visibly darker than surrounding sediment. The boring log for IR07B032 notes black clayey sand from 16 to 24 feet below ground surface (bgs). Similarly, the boring log for IR07MW27A notes dark sandy clay present between 12 and 21 feet bgs. Undifferentiated Upper Sands or Franciscan Formation bedrock is present below the fill at depths between 21 and 24 feet bgs based on these two logs. Dissolved oxygen and oxidation reduction potential measurements from well IR07MW27A indicate that reducing conditions necessary to produce methane are present, and the dark sediment may indicate the presence of methane-producing source material.

The concentrations which were detected are at levels such that a risk of explosion is present at the site. To eliminate the existing risk and mitigate any future risks of explosion, the Navy is planning this TCRA to remove existing soil gas and the associated methanogenic source material.

SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements

The DQOs specify the project objectives, the data collection boundaries and limitations, the most appropriate type of data to collect, and the level of acceptable decision error. The quality and quantity of data required to implement an environmental remedial action are also defined.

The project-specific DQOs, as defined through the seven-step process (EPA, 2006), for this project are as follows:

1. State the problem

The problem statement is included in Worksheet #10. Methane gas is present in soil gas at IR-07 at levels which pose threat to human health and the environment due to the potential for fire or explosion. The presence of methane in soil gas is indicative of a methanogenic source in the subsurface which could, if not removed, result in a potential for fire or explosion in the future.

2. Identify the goal of the study

The primary objective of this TCRA is to remove methane in soil gas and its source material from IR-07 to eliminate possible threats to public welfare now and in the future. The TCRA will confirm the presence of methane in soil gas, identify potential source material, refine the interpreted extent of the source, excavate the suspected source material to a maximum depth of 25 ft bgs, or until native material is identified, and backfill the excavation to match existing grade. Visually contaminated soil and soil or debris identified as potential methane-producing material will be disposed of off-site. These activities will ensure that methane in soil gas is removed, thereby eliminating the current threat. Removing the methane source material will also eliminate future threats due to continuing generation of methane gas.

The ubiquitous nature of contamination throughout IR-07, including potentially methanogenic constituents, makes definitive identification of the source material extremely difficult. Therefore, a phased approach to the TCRA shall be utilized wherein separate lines of evidence will be reviewed to achieve the objectives described above. Ultimately, the excavation will extend down to native material within the boundaries of the refined methane soil gas plume. If significant evidence of a shallow (above native material) source of methane is identified during review of the preliminary sampling

SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements (Continued)

results, this information shall be summarized and presented to the Navy and regulatory agencies with associated recommendations for discussion.

In order to meet the objective as described above, the following questions should be answered:

- Do analytical sampling results from the preliminary groundwater sampling activities indicate that there is an anthropogenic source of methane in the subsurface at IR-07?
- Can the presence of methane in soil gas be attributed to any potentially methanogenic material identified through visual observation and analytical waste characterization sampling during the preliminary sampling activities?
- Can the presence of methane in soil gas be attributed to any potentially methanogenic material identified through visual observation during the excavation activities?
- Is the depth and lateral extent of the excavation sufficient to remove the source material as identified during the preliminary sampling?

3. Identify information inputs

The following sources of information shall be used to achieve the objectives of this project:

- Field measurements of methane and VOCs in soil gas at temporary soil gas probes through the use of a GEM 2000 and PID, respectively
- Soil gas concentrations of methane as measured via laboratory analysis using Summa canisters
- Visual observations of soil and debris collected via continuous core during temporary groundwater monitoring well installation
- Analytical results for dissolved methane in groundwater collected at the temporary well locations
- Visual observations of material as it is excavated

SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements (Continued)

4. Define the boundaries of the study

The lateral boundaries of this study comprise the site boundaries as presented in Figure 3. The vertical boundaries of this study include the activities conducted at the surface down to the excavation and sampling activities described above to a maximum depth of 25 feet bgs. The temporal boundaries of this study are defined in the current project schedule included as Worksheet #16.

5. Develop the analytic approach

The following if/then statements have been developed as a method to determine if the goals of this study, as defined in Step 2, have been achieved:

- If dissolved methane is present in groundwater samples, then a review of the sampling results with respect to gradients and concentrations will be performed in an effort to identify potential source material in the saturated zone. Otherwise, the identification of potential methane source material shall be based on the results and observations collected during the other preliminary sampling activities described in this SAP and Work Plan.
    - In the event that the results of all preliminary sampling activities are not indicative of a potential source of methane, then the excavation will progress based on the criteria described below and in this SAP and Work Plan
- If non-anthropogenic, potentially methanogenic material is visually identified in the continuous cores, then these observations will be reviewed in combination with the results of the groundwater sampling in an effort to identify potential source material. Otherwise, the identification of potential methane source material shall be based on the results and observations collected during the other preliminary sampling activities described in this SAP and Work Plan.
    - If a correlation exists between the groundwater sampling results and these observations, then the general depth interval of the sampling shall be near or within a potential methane source.
    - In the event that the results of all preliminary sampling activities are not indicative of a potential source of methane, then the excavation will progress based on the criteria described below and in this SAP and Work Plan

SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements (Continued)

- If during the course of excavation within the boundaries of the refined methane soil gas plume, potentially methanogenic material is identified through visual observations, then the excavation shall continue laterally and vertically until either the material is no longer present or the boundaries of the study are reached. Otherwise, the excavation boundary shall comprise the lateral extent of the refined soil gas plume.
    - Potentially methanogenic material is preliminarily identified as material with high organic content, obvious staining, or otherwise comprising organic debris. This definition may be modified based on observations recorded as the excavation progresses.
- If the completed excavation extent is inclusive of all potentially methanogenic material, and methane is not detected in soil gas post-excavation, then the extent of excavation was sufficient to remove the sources of methane within the boundaries of this study.

6. Specify performance or acceptance criteria

Locations of soil gas, continuous coring, and groundwater sampling are judgmentally determined based on the previously reported soil gas concentrations, therefore a statistical method of evaluating adherence to criteria or sampling design is not appropriate. For soil gas measurements, GEM 2000 and PID will be calibrated according to the manufacturer's operation manual prior to data collection. In addition, 20 percent of the locations with the highest field measurements of methane and total VOCs will be collected in Summa canisters and analyzed by an off-site laboratory. To ensure sample integrity, a tracer compound (1,1-difluoroethane) will be introduced to the exterior of the soil gas probe at the junction of the tubing and the bentonite seal at the time of sample collection. Samples will be analyzed for 1,1-difluoroethane to ensure that only soil gas was collected.

Soil gas, groundwater, and soil samples will be collected in accordance with procedure described in the UFP-QAPP including sampling procedure, sample handling, and documentation. The subcontract laboratory, to be determined later, will perform analysis in accordance with the laboratory SOP.

Lithologic logging of the soil cores shall be conducted by trained field personnel in accordance with the Unified Soil Classification System (American Society for Testing and Materials D2488-90) and Munsell, or equivalent, color designations.

SAP Worksheet #11 – Project Quality Objectives/Systematic Planning Process Statements (Continued)

7. Develop the plan for obtaining data

To achieve the objectives of this TCRA, up to ten (10) temporary soil gas probes will be installed to refine the current extent of methane in soil gas. After soil gas probes are installed, methane, carbon dioxide, oxygen, temperature and barometric pressure will be measured using a GEM^{TM} 2000 and total volatile organic compounds using a photoionization detector. Soil gas samples from all of the soil gas probes will be collected in Summa canisters and analyzed for methane by American Society for Testing and Materials Method D-1946 and 1,1-difluoroethane (a tracer compound) by modified TO-3 method. Soil gas probe results will be submitted for the Navy and regulatory review prior to excavation.

Following the soil gas sampling activities, up to four borings will be advanced using direct-push technology to approximately 25 feet below ground surface bgs. Continuous cores will be collected at each location, followed by installation of temporary groundwater monitoring wells. In situ groundwater samples will be collected from each well at approximately 5 foot intervals (15, 20, and 25 foot bgs) and analyzed for dissolved methane by, RSK-175. Dissolved methane analytical results and groundwater sampling parameters (dissolved oxygen and oxidation-reduction potential) will be used to help identify potential methane source areas.

Five permanent soil gas probes will be installed within the excavation area after the removal action is completed. Methane will be measured using the GEM 2000 at each soil gas probe. One sample with the highest methane reading will be collected in a Summa canister and analyzed for methane and 1,1-difluoroethane (tracer compound) by an off-site laboratory. If the methane reading is zero from all probes, one location will be randomly selected to confirm the field measurement and satisfy leak detection requirements.

SAP Worksheet #12 – Measurement Performance Criteria Table

Measurement Performance Criteria Table – Field QC Samples (Soil Gas)

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Field duplicate	Methane in soil gas	10 percent	Precision	RPD < 30 percent	S

Measurement Performance Criteria Table – Field QC Samples (Groundwater)

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Field duplicate	Dissolved methane in groundwater	10 percent	Precision	RPD < 30 percent	S

SAP Worksheet #13 – Secondary Data Criteria and Limitations Table

Secondary data was not used in developing this SAP.

SAP Worksheet #14 – Summary of Project Tasks

Major tasks:

Utility Clearance and Land Surveying

Prior to intrusive activities, Underground Service Alert will be notified. Existing base utility drawings will also be reviewed, and a site walk with the Caretaker Site Office (CSO) and ROICC will be held to review the proposed excavation area and sampling locations. In addition, a subcontracted geophysical company using a variety of methods, including metal-locating techniques and ground-penetrating radar, will verify the location of underground utilities in the proposed removal action area.

Soil Gas Probe Installation

A direct-push sampling rig will be used install 10 temporary soil gas monitoring probes to a depth of 3 feet bgs. Soil gas and groundwater samples will be sued to help characterize the methane source area before excavation.

Soil Gas Measurement

At each location, the soil gas probe pressure will be measured using a vacuum/pressure gauge and recorded on a field data sheet. Methane soil gas concentrations will be measure with a CES-LANDTEC GEM™ 2000 (GEM 2000). These measurements will include the percent methane, percent carbon dioxide, percent oxygen, temperature, and barometric pressure. Once the methane measurements are complete, the GEM 2000 will be detached from the tubing, and a photoionization detector (PID) will be attached to the tubing to measure total VOCs. Procedure for soil gas measurement is presented below.

Soil Gas Measurement using GEM 2000

Soil gas probe will be installed as described in Section 3.3.1 of the Work Plan.

The following procedures will be used to collect soil gas measurements:

1. Don a new pair of disposable nitrile gloves immediately before collecting soil gas samples at each location.
2. Record the following information on the field data sheet: volume of probe and tubing, purging and sampling rates, and purging and sampling volumes.
3. Connect a Magnehelic® or equivalent pressure/vacuum gauge to the soil gas measurement assembly and record the pressure reading on the field data sheet.

SAP Worksheet #14 – Summary of Project Tasks (Continued)

4. Calibrate the GEM 2000 and PID at the beginning of each day and recalibrate if readings become erratic or if the ambient temperature changes more than 20 degrees Fahrenheit (°F) during the day of operation. Instrument calibration procedures will be in accordance with the instrument manufacturer's instruction manual. Ambient air will be used to zero the GEM 2000 per the manufacturer's instruction manual. The GEM 2000 operates between 32 to 104 °F and in relative humidity from zero to 95 percent. Measurements will not be collected if these ranges are exceeded.
5. Purge the assembly by connecting the inlet of a calibrated GEM 2000 to the sample port and purge until at least three tip and tubing volumes have been removed. The GEM 2000 has a purge rate of approximately 500 milliliters per minute.
6. After purging, allow the instrument to take the sample until there is a steady reading of gas concentration for 30 seconds.
7. Record percent methane, percent carbon dioxide, percent oxygen, temperature, and barometric pressure.
8. Disconnect the GEM 2000 from the sample port and attach a calibrated PID to the sample port. Purge the GEM 2000 with ambient air prior to use at the next sampling location.
9. After 30 seconds, record the PID reading on the field data sheet.
10. Disconnect the PID and proceed to the next location following the above procedures.

Confirmation Sampling and Leak Testing

Confirmation testing leak detection will be performed on approximately 20 percent of the soil gas probes, targeting those with the highest field measurements of methane and total VOCs. Soil gas will be collected in Summa canisters using the procedure described below, and analyzed for methane. Prior to confirmation sampling, a tracer compound, 1,1-difluoroethane, will be introduced to the exterior of the soil gas probe at the junction of the tubing and the bentonite seal.

Confirmation Sampling Procedure

Soil gas samples will be collected in a Summa canister from all of the probes to be analyzed for methane and leak test compound.

The following procedures will be used to collect soil gas samples:

SAP Worksheet #14 – Summary of Project Tasks (Continued)

1. Don a new pair of disposable nitrile gloves immediately before collecting soil gas samples at each location.
2. Record the following information on the field data sheet: volume of probe and tubing, purging and sampling rates, and purging and sampling volumes.
3. Connect a Magnehelic or equivalent pressure/vacuum gauge to the soil gas measurement assembly and record the pressure reading on the field data sheet. If the probe is influences by negative pressure in excess of 1 inch of water, then it should not be sampled because attempting to overcome the negative pressure may not detect gas at the correct concentration.
4. Purge the assembly by connecting the inlet of a calibrated GEM 2000 to the sample port, and making sure that there is a tight seal. Monitor until a steady state reading is achieved for 30 seconds and record the reading. It is not necessary to purge one probe volume of gas.
5. If sample is to be collected immediately after the soil gas measurement, purging of a soil gas probe has been completed. Therefore, performing step 1 through 4 is not necessary.
6. Prior to sampling, verify the gauge and initial vacuum of canister.
7. Introduce tracer compound (1,1-difluoroethane) to the exterior of the soil gas probe at the junction of the tubing and the bentonite seal.
8. Confirm the valve is closed (knob should already be tightened clockwise).
9. Remove the cap.
10. Attach particulate filter to canister.
11. Connect a cleaned canister, which is evacuated to at least 26 inches Hg, to the end of tubing that runs from the sampling tip to the surface.
12. Open the value ½ turn on a Summa canister. The pressure differential causes the sample to flow into the canister.
13. A fixed orifice flow restrictor will have a decrease in the flow rate as the vacuum canister approaches atmospheric (which is indicated by a change in pitch or sound level). Shut off hand valve immediately to avoid canister becoming neutral with atmosphere (it should remain in a slight vacuum). If the canister is allowed to become neutral the test is void. Repeat the test with a new canister.
14. Upon sample completion at the location, measure final vacuum of the canister.
15. Cap the Summa canister and tighten with a wrench slightly to seal.

SAP Worksheet #14 – Summary of Project Tasks (Continued)

16. The sample number, date, time, and description of the sample will be recorded on the COC record and in the field logbook. All entries will be written in indelible black or blue ink.

In Situ Groundwater Sampling

Immediately following the pre-excavation soil gas sampling activities, up to four borings will be installed to approximately 25 feet bgs to characterize the fill material and collect groundwater samples. The soil cores will be inspected for potential methane-generating material such as wood, petroleum contamination, and other organic material. The results of these analyses will be reviewed for the presence of organic contaminants, potentially indicative of methane-generating material.

In situ groundwater sampling for dissolved methane will be performed at approximately 5-foot intervals (15, 20, and 25 feet bgs) in each of the four borings. Groundwater samples will be collected using procedure described below.

Groundwater Sampling Procedure

Groundwater samples will be collected using the low-flow purge and sampling method. Disposable nitrile gloves will be worn during all purging and sampling. Nitrile gloves will be disposed of after the well is purged, and a new pair will be worn before each well is sampled to avoid possible cross-contamination.

The water quality meter will be calibrated to the manufacturer's specifications using current (unexpired) standards. Calibration results will be documented on the Field Calibration Form. A flow-through cell will be used to monitor the water quality indicator parameters.

Monitoring well purging and sampling using the low-flow purging and sampling method are described below.

1. Arrive at the monitoring well and confirm the well identification number.
2. Open the traffic box.
3. Remove any standing water that may have accumulated.
4. Unlock the well.
5. Install the water level indicator probe through a hole in the sampling cap.
6. Measure the groundwater from the sampling cap to the nearest 0.01 foot.

SAP Worksheet #14 – Summary of Project Tasks (Continued)

7. Record the measurement on the Well Sampling Log to the nearest 0.01 foot.
8. To avoid possible cross-contamination, place the flow-through cell and purge water container in a plastic tub or equivalent.
9. Attach the flow-through cell tubing and pressure hose to the sampling cap.
10. Begin pumping the well at 0.1 to 0.5 liter per minute (100 to 500 milliliters). Check the water level in the well, and measure the discharge rate of the pump by using a graduated cylinder every minute for the first 5 minutes. Ideally, the pumping rate should equal the well recharge rate with little or no water level drawdown in the well. (Drawdown shall be less than 0.3 foot.)
11. Measure and record the water level, discharge rate, and water quality indicator parameters in the well on the Well Sampling Log every 5 minutes during purging.
12. Check the discharge tubing for air bubbles during the purging process. If bubbles are visible, pluck the tubing where the bubble is to enable the bubble to pass through the tubing and into the flow-through cell.
13. During purging, monitor pH, temperature, turbidity, specific conductance, oxidation/reduction potential (ORP), and dissolved oxygen (DO) approximately every 5 minutes with a calibrated water quality meter.
14. The groundwater should be purged until indicator parameters have stabilized. The well will be considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings, as follows:
    - Consecutive readings within ± 0.1 standard units for pH
    - Consecutive readings within ± 1 degree Celsius (°C) for temperature
    - Consecutive readings within ± 10 percent for turbidity (when turbidity is greater than 10 nephelometric turbidity units)
    - Consecutive readings within ± 3 percent micromhos per centimeter for specific conductance
    - Consecutive readings within ± 10 millivolts for ORP
    - Consecutive readings within ± 0.3 for DO milligrams per liter (mg/L)

    If stabilization is not occurring and the procedure has been strictly followed, then sample collection can take place once three (minimum) to six (maximum) casing volumes have been removed. Record the specific information during purging in the field logbook or on the groundwater sampling log.

SAP Worksheet #14 – Summary of Project Tasks (Continued)

15. Once the water quality parameters have stabilized, disconnect the flow-through cell from the pump discharge tubing.
16. Collect samples for analysis of VOCs first, followed by other samples for analysis of organic compounds, inorganic parameters, and then general chemistry parameters (as applicable).
17. Fill volatile organic analysis (VOA) vials by initially tilting the vials, allowing the pump discharge to flow gently down the inside of the vial with minimal turbulence. Decrease the flow rate if necessary to reduce sample agitation. Fill each vial until a meniscus is formed at the top of the VOA vial. After the vial is full, cap immediately, invert the vial, tap the side lightly, and check for the presence of air bubbles. If air bubbles are present, discard the sample, and resample using a new vial.
18. Do not allow containers with preservative to be overfilled to the point where overflow occurs, as overfilling may result in loss of preservative.
19. Containers should be kept capped, except when they are being filled.
20. Affix a completed sample label to the sample container and cover with clear packaging tape.
21. Wrap glass bottles in bubble-wrap packaging material, place into resealable bags, and place sample containers into a cooler containing ice.
22. Record sample number, time and date, and requested analysis on COC form.

Excavation

The removal action excavation boundary will be finalized once the extent of the methan-producing waste has been evaluated suing results from soil, soil gas and groundwater analyses. The excavation will comprise the vertical and horizontal extent of the methane source material, to a maximum depth of 25 feet bgs or until native material is reached.

If the soil is not visually contaminated or identified as potential methanogenic material, it will be stockpiled for reuse as excavation backfill. This material will be used to backfill the excavation above any bridging material required as described above for depths greater than 15 feet bgs. The upper portion of the excavation will be backfilled with available clean backfill material on-site. The backfill material will be approved for use by the Navy and has been tested in accordance with Clean Imported Fill Material guidelines by Department of Toxic Substances Control.

Post-excavation soil gas sampling

SAP Worksheet #14 – Summary of Project Tasks (Continued)

Five permanent soil gas probes will be installed to monitor methane levels after the removal action excavation is completed. Methane will be measured using the GEM 2000 at each soil gas probe. One sample with the highest methane reading will be collected in a Summa canister and analyzed for methane and 1,1-difluoroethane (tracer compound) by an off-site laboratory. If the methane reading is zero from all probes, one location will be randomly selected to confirm the field measurement and satisfy leak detection requirements.

Field documentation

Field data will be recorded in the field logbook as described in Worksheet #27. All information pertinent to field sampling will be recorded in a field logbook to maintain the integrity and traceability of samples. All samples will be properly labeled and custody sealed before they are transported to the laboratory and will be accompanied by completed chain-of-custody documentation. All documentation will be recorded in a field logbook in indelible ink.

Laboratory analysis of soil gas, soil, and groundwater samples

The handling of the samples and transferring of custody must be well documented given the evidentiary nature of the analytical data. The integrity and traceability of samples from the time they are collected through the time data are reported are essential in any sampling and analysis program. Sample custody and procedures are described in Worksheet #27. Sampling locations and analytical methods are described further in Worksheet # 18 through Worksheet # 20.

Land surveying

Prior to sampling and excavation, the proposed perimeter of the excavation will be surveyed. Each pre-excavation sampling location will be surveyed to an accuracy of 0.01 foot vertically and 0.1 foot horizontally and will be in accordance with the North American Vertical Datum 88 and the North American Datum 83, respectively. Results will be generated by the survey subcontractor and will be signed by a state of California-certified surveyor. The final excavation boundary and depth will also be surveyed.

Waste Characterization

Excavated material will be direct-loaded into dump trucks for transport to the radiological screening pads. Radiological characterization for disposal of mixed waste will be

SAP Worksheet #14 – Summary of Project Tasks (Continued)

performed by Tetra Tech EC, Inc., under separate contract and planning documents. Non-radiological excavated soil will be sampled and analyzed for waste characterization based on the requirements of the disposal facility. Samples will be collected at a frequency of one sample per every 500 cubic yards of soil with a minimum of five samples collected from any excavated soil unit with a total volume less than 2,500 cubic yards.

Water from the dewatering pads and decontamination activities will be collected and stored in approved storage containers. One sample per approved container will be collected and analyzed for parameters required by the disposal facility. Since analytical parameters to be tested for waste characterization depends on the disposal facility, they are not included this SAP.

Decontamination Procedure

Decontamination of water level meter will be performed to prevent the introduction of extraneous material into samples, and to prevent cross-contamination between samples. All sampling equipment will be decontaminated by washing with a nonphosphate detergent such as Liquinox® as follows:

1. Dilute the nonphosphate detergent with potable water in a bucket as directed by the manufacturer. Wash the equipment with the nonphosphate detergent and potable water solution.
2. Use a second bucket with potable water to rinse the equipment.
3. Use a third bucket with potable water to rinse the equipment again.
4. Use a fourth bucket with deionized water as a final rinse for the equipment. (Certificates from the supplier demonstrating that the deionized water is analyte-free will be kept in the project files for each lot.)

Low-flow bladder pump will be decontaminated as follows:

5. Dilute the nonphosphate detergent with potable water in a container as directed by the manufacturer. Disassemble the pump and rinse components in the container for a minimum of 5 minutes.
6. Use a second container with potable water to rinse the equipment for a minimum of 5 minutes.
7. Use a third container with potable water to rinse the equipment again for a minimum of 5 minutes.

SAP Worksheet #14 – Summary of Project Tasks (Continued)

8. Use a fourth container with deionized water to rinse the equipment for a minimum of 5 minutes. Certificates from the supplier demonstrating that the deionized water is analyte-free will be kept in the project files for each lot.

Data Management and Data Validation:

Laboratory Data:

The laboratory will verify sample receipt and document in a sample receipt form after samples are received at the laboratory. In addition, samples will be assigned a unique number and recorded in the laboratory internal COC.

The laboratory will report data by submitting data packages. For this project, 90 percent of the data will be submitted in an EPA Level III-equivalent data package and 10 percent submitted in an EPA Level IV-equivalent data package.

All data reported by the analyst must be reviewed by a peer analyst qualified to perform the method and a supervisor prior to reporting the data. In addition, the laboratory QA manager must annually review 10 percent of the data reported for each section. The laboratory QA manager review may be conducted after the data have been reported.

All data will be reported on or before the designated turnaround time by fax/e-mail. The Project Chemist will review the data upon receipt prior to releasing to project personnel to verify that the sampling procedures and analytical results were obtained following the protocols in this SAP and are of sufficient quality to satisfy data quality objective (DQOs).

On or before 21 calendar days from sample receipt, the laboratory will submit hard-copy data with associated QC information, along with an electronic data deliverables compatible with NEDD.

Electronic Data:

Field data from the COCs (date and time collected, sample identification, etc.) will be entered into the database by the Project Chemist. Survey data will be recorded by a field surveyor and also entered into the database. All sample locations, except for waste characterization samples, will be surveyed in accordance with Environmental Work Instruction EVR.6, Environmental Data Management and Required Electronic Delivery Standards (SWDIV, 2005). For NEDD deliverables, horizontal control information will

SAP Worksheet #14 – Summary of Project Tasks (Continued)

be captured in the State Plane Coordinate System (North American Datum 83) in feet, and vertical control standards will be in mean sea level (North American Vertical Datum 88) in feet.

The EDD from the laboratory that will be compatible with NEDD requirements will be uploaded into the SES-TECH database. The data will be checked for required values and project-specific requirements by the database. Any discrepancies in the EDD will either be corrected by SES-TECH, or the laboratory will be notified to make corrections. The electronic data in NEDD format will be submitted to the DON 30 calendar days after the validation report is received.

Data validation

The analytical data validation component follows NAVFAC SW Environmental Work Instruction #1. The analytical data will be sent to an independent third-party data validation company. The data validation prescribed for this project is 90 percent level 3 and 10 percent level 4. The flagging associated with third-party data validation report will be entered into the database for each sample. The analytical data will be uploaded to the NAVFAC SW Navy Installation Restoration Information Solution (NIRIS) website in accordance with NAVFAC SW Environmental Work Instruction #6, no later than 30 days after completion of the third-party data validation report.

SAP Worksheet #15.1 – Reference Limits and Evaluation Table (Soil Gas)

Matrix: Soil Gas
Analytical Group: Methane, 1,1-Difluoroethane

Analyte	CAS Number	Project Action Limit % (v/v)	Project Action Limit Reference	Project Quantitation Limit Goal	Laboratory-specific	
					QLs	MDLs
Methane	74-82-8	NA [1]	NA	0.003 % (v/v)	0.003 % (v/v)	0.001 % (v/v)
1,1-Difluroethane	75-37-6	NA[2]	NA	10,000 ug/m^3	10,000 ug/m^3	5,000 ug/m^3

Notes:

[1] Regulatory limit for methane is not established. Laboratory QL will be used to determine whether methane is present in soil gas.

[2] 1,1-difluoroethane is used as a tracer compound to check for leaks in a soil gas probe. Therefore, a project action limit is not established for 1,1-difluoroethane.

SAP Worksheet #15.2 – Reference Limits and Evaluation Table (Groundwater)

Matrix: Groundwater
Analytical Group: Dissolved Methane

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Laboratory-specific	
					QLs (µg/L)	MDLs (µg/L)
Methane	74-82-8	N/A [1]	N/A	1.0	1.0	0.6

Notes:

[1] Regulatory limit for methane is not established. Laboratory QL will be used to determine whether methane is present in groundwater.

SAP Worksheet #16 – Project Schedule/Timeline Table

The project Schedule is included as Figure 4.

SAP Worksheet #17 – Sampling Design and Rationale

To implement removal action at IR-07, soil gas, soil and groundwater samples will be collected prior to excavation activities to help identify source areas and refine the extent of the excavation. Once the extent of the methane-producing waste has been evaluated, the source area will be excavated. After the removal action excavation is backfilled, five permanent soil gas probes will be installed. Sampling design and rationale for this removal action are discussed below.

Soil Gas Sampling

To help refine the current extent of the methane source area, up to ten (10) temporary soil gas probes will be installed. Locations of soil gas probes are determined based on the previously reported soil gas concentration (Figure 3). A direct-push drill rig will be used to install soil gas probes. The soil gas probes consist of an intake screen attached to an expendable probe tip. The probe will be connected to the surface via tubing connected to a hose barb at the top of the screen. The tubing will be capped to seal the probe from the atmosphere. After soil gas probes are installed, methane, carbon dioxide, oxygen, temperature, and barometric pressure will be measured using GEM 2000. Once methane measurement is completed, a PID will be attached to the tubing to measure total VOCs.

Confirmation testing and leak detection will be performed at all soil gas probes. Prior to sampling at each location, a tracer compounds (1,1-difluoroethane) will be introduced to the exterior of the soil gas probe at the junction of the tubing and the bentonite seal. Soil gas samples will be collected in Summa canisters and analyzed for methane by ASTM Method D-1946 and 1,1-difluoroethane by modified TO-3 method. Soil gas probe results will be submitted for the Navy and regulatory review prior to excavation. Soil gas probes installed within the excavation boundary will be excavated. Probes installed outside the excavation boundary will be removed and the borings will be tremie backfilled with cement-bentonite grout to the ground surface.

In situ Soil and Groundwater Sampling

Immediately following the soil gas sampling activities, up to four borings will be advanced using a direct-push drill rig to approximately 25 feet bgs to evaluate the lithologic content of the fill material. This information will be used to help identify potential methane source areas and refine the interpretation of the extent of the excavation. Locations of soil borings are selected based on the previously reported soil gas concentrations (Figure 3). Continuous soil cores will be 1) visually inspected for potential chemical impacts; 2) field screened for methane and VOCs using GEM 2000

SAP Worksheet #17 – Sampling Design and Rationale (Continued)

and PID; and 3) logged in accordance with the Unified Soil Classification System and Munsell, or equivalent, color designations. The soil cores will be inspected for potential methane-generating material such as wood, petroleum contamination, and other organic material.

In situ groundwater samples will also be collected from each soil boring at approximately 5-foot intervals (15, 20, and 25 foot bgs). Groundwater samples will be collected using the procedure described in Worksheet #14, and analyzed for dissolved methane by RSK-175. Dissolved methane analytical results and groundwater sampling parameters (DO and ORP) will be used to help identify potential methane source areas.

Post Excavation Soil Gas Sampling

Five permanent soil gas probes will be installed within the excavation area after the removal action is completed. Permanent soil gas probes will be installed using the direct-push drill rig. Permanent soil gas probes will be finished with a traffic-rated cover set in concrete. Methane will be measured using the GEM 2000 at each soil gas probe. One sample with the highest methane reading will be collected in a Summa canister and analyzed for methane and 1,1-difluoroethane (tracer compound) by an off-site laboratory. If the methane reading is zero from all probes, one location will be randomly selected to confirm the field measurement and satisfy leak detection requirements.

SAP Worksheet #18 – Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ ID Number	Matrix	Depth (feet)	Analytical Group	Number of Samples	Sampling SOP Reference
02-001	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-002	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-003	Soil gas	2	Methane 1,1-Difluoroethane	1 (field duplicate)	Worksheet # 14[1]
02-004	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-005	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-006	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-007	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-008	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-009	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-010	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-011	Soil gas	2	Methane 1,1-Difluoroethane	1	Worksheet # 14[1]
02-012	Groundwater	15	Dissolved Methane	1	Worksheet # 14[1]
02-013	Groundwater	20	Dissolved Methane	1	Worksheet # 14[1]
02-014	Groundwater	25	Dissolved Methane	1	Worksheet # 14[1]
02-015	Groundwater	15	Dissolved Methane	1	Worksheet # 14[1]
02-016	Groundwater	20	Dissolved Methane	1	Worksheet # 14[1]

SAP Worksheet #18 – Sampling Locations and Methods/SOP Requirements Table (Continued)

Sampling Location/ ID Number	Matrix	Depth (feet)	Analytical Group	Number of Samples	Sampling SOP Reference
02-017	Groundwater	20	Dissolved Methane	1 (field duplicate)	Worksheet # 14[1]
02-018	Groundwater	25	Dissolved Methane	1	Worksheet # 14[1]
02-019	Groundwater	15	Dissolved Methane	1	Worksheet # 14[1]
02-020	Groundwater	20	Dissolved Methane	1	Worksheet # 14[1]
02-021	Groundwater	25	Dissolved Methane	1	Worksheet # 14[1]
02-022	Groundwater	15	Dissolved Methane	1	Worksheet # 14[1]
02-023	Groundwater	20	Dissolved Methane	1	Worksheet # 14[1]
02-024	Groundwater	25	Dissolved Methane	1	Worksheet # 14[1]
02-025	Soil gas	2	Methane/1,1-difluoroethane	1	Worksheet # 14[1]
02-026	Soil gas	2	Methane/1,1-difluoroethane	1 (field duplicate)	Worksheet # 14[1]

Notes:

[1] Sampling SOP will not be utilized for this project. Step by step sampling procedures are presented within Worksheet #14.

SAP Worksheet #19 – Analytical SOP Requirements Table

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Containers (number, size, and type)	Sample Volume (units)	Preservation Requirements (chemical temperature, light protected)	Maximum Holding Time (preparation/analysis)
Soil gas	Methane	ASTM D-1946	One - 6 liter passivated Summa canister	10 psig	None	30 days
Soil gas	1,1-difluoroethane	TO-3 modified				
Groundwater	Dissolved methane	RSK-175	Three - 40 ml VOA vials	80 mL	pH ≤ 2 w/HCl, 4±2°C	14 days

SAP Worksheet #20 – Field Quality Control Sample Summary Table

Matrix	Analytical Group	No. of Sampling Locations	No. of Field Duplicates	No. of MS/MSDs	No. of Field Blanks	No. of Equipment Blanks	No. of VOA Trip Blanks	No. of PT Samples	Total No. of Samples to Lab
Soil gas	Methane	10	1	1 [1]	0	0	0	0	12
Soil gas	1,1-Difluoroethane	10	1	1 [1]	0	0	0	0	12
Groundwater	Dissolved methane	12	2	1	0	0	0	0	15

Notes:

[1] Laboratory duplicate will be performed instead of MS/MSD for soil gas samples.

SAP Worksheet #21 – Project Sampling SOP References Table

Sampling standard operating procedures will not be utilized in this project. Sampling procedures and sample handling procedures are detailed within Worksheet #14.

SAP Worksheet #22 – Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Activity	Frequency	Acceptance Criteria	Corrective Action	Resp. Person	SOP Reference[2]	Comments
GEM™2000	Calibration with methane, carbon dioxide, oxygen	Daily	Within manufacturer's recommended value	According to manufacturer's instructions	Sampling Personnel	Manufacturer's instructions	None
PID	Calibration with 1,1-difluoroethane/Methane	Daily	Within manufacturer's recommended value	According to manufacturer's instructions	Sampling Personnel	Manufacturer's instructions	None
Water quality meter	Calibration with standards for pH, turbidity, specific conductance, oxidation reduction potential, and dissolved oxygen per manufacturer's recommendation	Daily	Within manufacturer's recommended value	According to manufacturer's instructions	Sampling personnel	Manufacturer's instructions	None

SAP Worksheet #23 – Analytical SOP References Table

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
25.1946.01	ASTM 1945/1946, Perment Gases April 2008	Definitive	Soil gas / Methane	GC – FID/TCD	Environmental Analytical Services, Inc.	N
21.TO3.01	EPA TO 3 Hydrocarbon Speciation by GC/FID May 2008	Definitive	Soil gas / 1,1-Difluoroethane	GC/FID	Environmental Analytical Services, Inc.	Y
EMAX-RSK 175	Dissolved Gases 23 March 04 / 19 July 07	Definitive	Groundwater/Dissolved methane	GC/FID	EMAX Laboratories	N

Notes:

23 March 04 / 19 July 07 – Date of last revision change by laboratory / date of last review by laboratory

SAP Worksheet #24 – Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for Corrective Action	SOP Reference
GC/ TCD	Initial Calibration	Initially; as needed	Single point calibration	1) Evaluate system 2) Evaluate use of data and target compounds and run samples if data quality is not effected 3)Rerun Initial Calibration	Analyst Environmental Analytical Services, Inc.	25.1946.01
	Continuing Calibration Verification (CCV)	Daily, before sample analysis and every 24 hours of analysis time	Duplicate standards must agree <1% area counts.	1) Evaluate system 2) Rerun standard 3) Check concentrator 4) New Initial Calibration	Analyst Environmental Analytical Services, Inc.	25.1946.01
GC/ FID	Initial calibration	Initial, and as needed	3 points calibration RSD for each analyte < 20%	1) Evaluate system 2) Evaluate use of data and target compounds and run samples if data quality is not effected 3)Rerun Initial Calibration	Analyst Environmental Analytical Services, Inc.	21.TO3.01
	CCV	Daily, before sample analysis and every 24 hours of analysis time	RSD for each analyte <30%	1) Evaluate system 2) Rerun standard 3) Check concentrator 4) New Initial Calibration	Analyst Environmental Analytical Services, Inc.	21.TO3.01

SAP Worksheet #24 – Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for Corrective Action	SOP Reference
GC	Minimal five point Initial Calibration for all analytes	Initial, and as needed	RSD for each analyte $\leq$ 20%	Correct problem then repeat initial calibration. No samples may be run until ICAL has passed.	Analyst, EMAX Laboratories, Inc.	EMAX-RSK175
	Second source calibration verification	Once after each initial calibration	Value of second source for all analytes within $\pm$ 20% of expected value (initial source)	Correct problem and verify second source standard,. Rerun second source verification. If that fails, correct problem and repeat initial calibration. No samples may be run until calibration has been verified.	Analyst, EMAX Laboratories, Inc.	EMAX-RSK175
	Calibration verification (initial [ICV] and continuing [CCV]	ICV: daily, before sample analysis CCV: After every 10 field samples and at the end of the analysis sequence	All analytes within $\pm$ 20% of expected value from the ICAL	ICV: Correct problem, rerun ICV. If that fails, repeat initial calibration. CCV: Correct problem then repeat CCV and reanalyze all samples since last successful calibration verification.	Analyst, EMAX Laboratories, Inc.	EMAX-RSK175

SAP Worksheet #24 – Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for Corrective Action	SOP Reference
				If %D for an individual analyte is > 20%, no samples may be analyzed until the problem has been corrected.		

SAP Worksheet #25 – Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC – FID/TCD		LCS/LCSD		After the calibration and before method blank and sample	Laboratory established limits	Inspect instrument for malfunctions. Reanalysis of CCV and samples analyzed while system was malfunctioning.	Analyst	Laboratory SOP reference will be included in the final version after a laboratory has been procured
		Method Blank		One per batch of 20 samples	No analytes detected > RL.	Inspect instrument for malfunctions. Reanalysis of CCV and samples analyzed while system was malfunctioning.	Analyst	Laboratory SOP reference will be included in the final version after a laboratory has been procured

SAP Worksheet #26 – Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): SES-TECH Sampling Personnel
Sample Packaging (Personnel/Organization): SES-TECH Sampling Personnel
Coordination of Shipment (Personnel/Organization): SES Project Chemist
Type of Shipment/Carrier: Laboratory Courier or Commercial Courier
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Laboratory Sample Custodian/EAS and EMAX
Sample Custody and Storage (Personnel/Organization): Laboratory Sample Custodian/ EAS and EMAX
Sample Preparation (Personnel/Organization): Laboratory Sample Preparation Group/ EAS and EMAX
Sample Determinative Analysis (Personnel/Organization): Laboratory Bench Chemist/ EAS and EMAX
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): 60 days
Sample Extract/Digestate Storage (No. of days from extraction/digestion): 120 days
Biological Sample Storage (No. of days from sample collection): N/A
SAMPLE DISPOSAL
Personnel/Organization: Laboratory Sample Custodian
Number of Days from Analysis: 3 weeks for VOCs, 6 months for metals, and 3 months for all other analysis

SAP Worksheet #27 – Sample Custody Requirements Table

Field Documentation

All information pertinent to field sampling will be recorded in a field logbook to maintain the integrity and traceability of samples. All samples will be properly labeled and custody sealed before they are transported to the laboratory and will be accompanied by completed chain-of-custody documentation. All documentation will be recorded in a field logbook in indelible ink.

Sample Number

All samples submitted to an analytical laboratory will be uniquely numbered as listed in Worksheet #18. The sample number will be recorded in the field logbook and on the labels and chain-of-custody form when the sample is collected. A complete description of the sample and sampling conditions will be recorded in the field logbook and referenced using the unique sample identification number.

Sample Labeling

Sample labels are necessary to prevent misidentification of samples. Sample labels will be filled out in indelible ink and affixed to sample containers when the sample is collected. Each sample label will be covered with clear tape. Each sample container will be labeled with the following, at a minimum:

- Company name
- Sample identification number
- Sample collection date (month/day/year)
- Time of collection (24-hour clock)
- Sampler's initials
- Analyses required
- Preservative (if any)

Chain of Custody

To establish the documentation necessary to trace sample possession from the time of collection through analysis and disposal, a chain-of-custody record will be completely filled out and will accompany every sample. Samples will be delivered to the laboratory for analysis as soon as practicable. A chain-of-custody record will accompany all samples. A copy of the chain-of-custody form is provided at the end of this worksheet.

SAP Worksheet #27 – Sample Custody Requirements Table (Continued)

The following will be recorded on the COC record:

- Project name
- Project location
- Project number
- Sample ID
- Sampler name
- Sampler signature
- Project contact
- Airbill number (if applicable)
- Date of sample collection
- Time of sample collection to the nearest minute, 24-hour clock
- Sample type (matrix)
- Turnaround time
- Sample depth in feet (start, end)
- Laboratory name
- Number of sample containers
- SAP Worksheet #27 – Sample Custody Requirements Table
- Analysis required
- Comments
  - Matrix spike/matrix spike duplicate (MS/MSD) samples
  - Observations specific to sample
  - Field filtered
- Transfer signature to relinquish samples
  - The sampler will be the first person to relinquish sample possession
- Courier/laboratory representative signature (for commercial carrier, record airbill number here [if applicable])
- Date/time (of custody transfer)
- Laboratory instruction

SAP Worksheet #27 – Sample Custody Requirements Table (Continued)

- Data package requirement (Level III or IV)

Field Logbooks

A permanently bound field logbook with consecutively numbered pages, used for sampling activities only, will be assigned to this project. All entries will be recorded in indelible ink. The logbook pages will be signed by the responsible sampler at the end of each workday, and any unused portions of the logbook pages will be crossed out, signed, and dated.

If it is necessary to transfer the logbook to another person, the person relinquishing the logbook will sign and date the last page used, and the person receiving the logbook will sign and date the next page to be used.

At a minimum, the logbook will contain the following information:

- Project name and location
- Date and time
- Personnel in attendance
- General weather information
- Work performed
- Field observations
- Sampling performed, including specifics such as location, type of sample, type of analyses, and sample identification
- Field analyses performed, including results, instrument checks, problems, and calibration records for field instruments
- Descriptions of deviations from this SAP
- Problems encountered and corrective action taken
- Identification of field QC samples
- QC activities
- Verbal or written instructions

Sample Handling and Shipping

This procedure will be followed for soil and water samples.

SAP Worksheet #27 – Sample Custody Requirements Table (Continued)

Immediately after sample labeling, custody seals will be affixed to each sample container. For vials, the custody seal will be placed on the outside of the first resealable bag; then the container will be placed in a second resealable bag. This will prevent any contact with the adhesive from the custody seal and the sample. Other sample containers will be placed in double-resealable plastic bags to protect the sample from moisture and to prevent breakage and potential cross-contamination during transportation to the laboratory. All glass sample containers will be protected with bubble wrap first if transported by a commercial carrier. Vials should be wrapped with bubble wrap, then placed in a resealable bag, a custody seal placed over the bag, and then placed in another resealable bag.

Each cooler will be shipped with a temperature blank. A temperature blank is a vial filled with tap water and stored in the cooler during sample collection and transportation. The temperature of the cooler will be recorded by the laboratory on the COC record immediately upon receipt of the samples.

Samples transported by a laboratory-assigned courier will be packed in a sample cooler with sufficient ice (cooler will be approximately half full of wet ice that is below and above sample containers). Two custody seals will be taped across the cooler lid: one seal in the front and one seal in the back. The COC record will be completed and signed by the courier. The cooler and the top two copies (white and pink) of the COC record will then be released to the courier for transportation to the laboratory.

Samples to be shipped by commercial carrier will be packed in a sample cooler lined with a plastic bag. Ice will be double-bagged and placed at the bottom of the cooler, one layer of sample containers will be placed on the ice, and more double-bagged ice will be placed on top of the containers. This will be repeated until the cooler is filled with ice as the top layer in the cooler. The COC record will include the airbill number, and the Received By box will be labeled with the commercial courier's name. The top two copies of the COC record will be sealed in a double-resealable bag and then taped to the inside of the sample cooler lid. The cooler will be taped shut with strapping tape. Two custody seals will be taped across the cooler lid: one seal in the front and one seal in the back. Clear tape will be applied to the custody seals to prevent accidental breakage during shipment. The pouch for the airbill will be placed on the cooler and secured with clear tape. The airbill will be completed for priority overnight delivery and placed in the pouch. If multiple coolers are being shipped, the original airbill will be placed on the cooler with the COC record, and copies of the airbill will be placed on the other coolers. The number of

SAP Worksheet #27 – Sample Custody Requirements Table (Continued)

packages should be included on each airbill (1 of 2, 2 of 2). Saturday deliveries should be coordinated with the laboratory in advance, and field sampling personnel or their designee must ensure that Saturday delivery stickers are placed on each cooler by the commercial courier.

Document Corrections

Changes or corrections on any project documentation will be made by crossing out the erroneous item with a single line and initialing (by the person performing the correction) and dating the correction. The original item, although erroneous, must remain legible beneath the cross-out line. The new information should be written clearly above the crossed-out item.

Laboratory Sample Custody and Documentation

The integrity and traceability of samples from the time they are collected through the time data are reported are essential in any sampling and analysis program. The handling of the samples and transferring of custody must be well documented given the evidentiary nature of the analytical data.

The sample custodian will sign the COC from the courier or FedEx, inventory each shipment, and note on the original COC record any discrepancy in the sample custody, temperature of the cooler, or broken samples. The laboratory will note discrepancies on the sample receipt form. The laboratory project manager will immediately notify the Project Chemist who, in consultation with the project team, will provide instructions in writing to the laboratory.

The laboratory will have a system for tracking samples that is consistent with Section 5.8 of the QSM (DOD, 2006). The laboratory will archive the samples and maintain their custody up to 90 calendar days after sample collection, at which time the samples will be disposed of by the laboratory.

SAP Worksheet #27 – Sample Custody Requirements Table

COC NUMBER _____

CHAIN-OF-CUSTODY RECORD

PROJECT NAME		PURCHASE ORDER NO		ANALYSES REQUIRED																LABORATORY NAME
PROJECT LOCATION		PROJECT NO.																		
SAMPLER NAME		AIRBILL NUMBER																		LABORATORY ID (FOR LABORATORY)
PROJECT CONTACT		PROJECT CONTACT PHONE NUMBER																		
SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT													COMMENTS
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)		LABORATORY INSTRUCTIONS/COMMENTS																SAMPLING COMMENT:
COMPANY	TIME	COMPANY																		
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)																		
COMPANY	TIME	COMPANY																		
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)		SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)																
COMPANY	TIME	COMPANY		TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN																
				COOLER SEAL: ☐ INTACT ☐ BROKEN																

SAP Worksheet #28.1 – Laboratory QC Samples Table (Methane)

Matrix: Soil Gas
Analytical Group: Methane
Analytical Method/SOP Reference: ASTM D-1946/ 25.1946.01

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	One per 20 samples	Oxygen <0.3% Nitrogen <1% Others <0.001%	1) Analyze another blank 2) If blank levels are dropping significantly continue running blanks 3)If two reruns of blanks are the same, clean concentrator with heat gun 4)Runs samples in holding times and flag blanks	Analyst	Accuracy	Oxygen <0.3% Nitrogen <1% Others <0.001%
Laboratory Control Spike	One per daily batch	90-110%	1) Reanalyze LCS 2) Recalibrate LCS	Analyst	Accuracy	90-110%
Laboratory Duplicate (LD)	One per 20 samples	RPD <5%	1) Reanalyze LD 2) Repair concentrator	Analyst	Precision	RPD <5%

SAP Worksheet #28.2 – Laboratory QC Samples Table (1,1-difluoroethane)

Matrix: Soil Gas
Analytical Group: 1,1-difluoroethane
Analytical Method/SOP Reference: EPA TO-3 / 21.TO3.01

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	One per 20 samples	No target analyte > RL	1) Analyze another blank 2) If blank levels are dropping significantly continue running blanks 3)If two reruns of blanks are the same, clean concentrator with heat gun 4)Runs samples in holding times and flag blanks	Analyst	Accuracy	No target analyte > RL

SAP Worksheet #28.3 – Laboratory QC Samples Table (RSK 175)

Matrix: Water
Analytical Group: Methane
Analytical Method/SOP Reference: RSK 175/EMAX-RSK 175

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	One per preparation batch	All analytes <1/2 QLs	Re-prep and reanalyze MB and all samples processed with the non-conforming MB.	Analyst	Accuracy/Bias - Contamination	All analytes <1/2 QLs
LCS	One per sample preparation batch	70–140	Re-prep and reanalyze LCS and all samples processed with the non-conforming LCS.	Analyst	Accuracy/Bias	70–140
MS/MSD	Project designated sample matrix QC.	60–140 RPD: ± 20%	If result is indicative of matrix interference, discuss in case narrative. Otherwise check for possible source of error, and extract / reanalyze the sample.	Analyst	Interferences - Accuracy/Bias - Precision	60–140 RPD: ± 20%
PT	Bi-annual	Within PT Study Limits	Review source of error perform corrective action PT sample.	Analyst	Accuracy/Bias	Within PT Study Limits

SAP Worksheet #29 – Project Documents and Records Table

Document	Where Maintained
Field logbook	Project file
Sample labels	Laboratory
COC	Project file and laboratory
Supplies certification	Project file
Shipping records	Project file
Field surveillance reports	Project file
Laboratory data package including: Sample receipt and login Laboratory internal COC Instrument calibration logs Sample preparation logs Sample analysis/run logs Nonconformance reports including corrective actions	Laboratory and project file; project file copy will subsequently be sent to NAVFAC SW Administrative Record.
Data validation report	Validator and project file; project file copy will subsequently be sent to NAVFAC SW Administrative Record

SAP Worksheet #30 – Analytical Services Table

Matrix	Analytical Group	Sample Locations/ID Number	Analytical Method	Data Package Turnaround Time	Laboratory/Organization (name and address, contact person and telephone number)	Backup Laboratory/ Organization (name and address, contact person and telephone number)
Soil gas	Methane	02-001 through 02-011, 02-017, 02-018	ASTM D-1946	21 days	Environmental Analytical Services, Inc. 173 Cross Street San Luis Obispo, CA 93401 Lesley Wise (805) 781-3585	Test America – Los Angeles 1721 South Grand Ave. Santa Ana, CA 92705 (714) 258-8610
Soil gas	1,1-Difluoroethane		EPA TO-3	21 days		
Groundwater	Dissolved methane	02-004 through 02-016	RSK-175	21 days	EMAX Laboratories, Inc. 1835 W. 205th Street, Torrance, CA 90501 Richard Beauvil (310) 618-8889	Test America – West Sacramento 880 Riverside Parkway West Sacramento, CA 95605 David Altucker (916) 374-4383

SAP Worksheet #31 – Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (title and organizational affiliation)	Person(s) Responsible for Responding to Assessment Findings (title and organizational affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (CA) (title and organizational affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (title and organizational affiliation)
Readiness Review	Once	Internal	SES-TECH	QCM, SES	Project Manager, SES	Project Manager, SES	Project Manager and QCM, SES
Field Sampling Surveillance	Once at the beginning, once during, and once toward the end of field sampling activities	Internal	SES-TECH	QCM, SES	Project Manager, SES	Project Manager, SES	Project Manager and QCM, SES
Management Review	Once	Internal	SES-TECH	QCM, SES	Project Manager, SES	Project Manager, SES	QCM, SES

SAP Worksheet #32 – Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (name, title, organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (name, title, organization)	Timeframe for Response
Field Sampling Surveillance	Surveillance Report	Project Manager, SES-TECH	7 days after completion of the inspection	Corrective Action Report	QCM, SES	5 days after notification
Data Review Surveillance	Surveillance Report	Project Manager, SES-TECH	7 days after completion of the inspection	Corrective Action Report	Project Manager, SES-TECH, QCM, SES	14 days after notification
Management Review	Surveillance Report	Project Manager, SES-TECH	7 days after completion of the inspection	Corrective Action Report	QCM, SES	14 days after notification

SAP Worksheet #33 – QA Management Reports Table

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (title and organizational affiliation)	Report Recipient(s) (title andorganizational affiliation)
Field Sampling Surveillance Report	One at start up of sampling	Deficiencies will be discussed with the project team on the day surveillance is conducted. Report will be issued 10 days after surveillance date.	Project Chemist, SES-TECH	Project Manager, SES-TECH QCM, SES
Management Review Report	Once during field activities	Report will be issued 10 days after management review is completed.	QCM, SES-TECH	Project Manager, SES-TECH Program Manager, SES-TECH

SAP Worksheet #34 – Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (name, organization)
Field logbook	Field logbooks will be reviewed and placed in the project file upon project completion.	Internal	Field Sampling Personnel (SES-TECH) QCM (SES-TECH)
COC forms	COC forms will be reviewed upon their completion and verified for completeness. A copy of the COC will be retained in the project file, and the original and remaining copies taped inside the container for shipment.	Internal	Field Sampling Personnel (SES-TECH)
Sample logins	Sample login information will be reviewed and verified for completeness in accordance with the COC forms.	Internal External	Project Chemist (SES-TECH) Laboratory Project Manager, (Environmental Analytical Services, Inc., and EMAX Laboratories)
Laboratory data prior to release	Laboratory data will be reviewed and verified for completeness against analyses requested on the COC forms.	External	Laboratory Project Manager (Environmental Analytical Services, Inc., and EMAX Laboratories)
Laboratory data packages	All laboratory data packages will be verified by the laboratory performing the work for completeness and technical accuracy prior to submittal. Data packages will then be reviewed by the Project Chemist for completeness. Subsequently, data packages will be evaluated externally according to the data validation procedures specified in Worksheet #36 of this SAP.	External Internal External	Laboratory (Environmental Analytical Services, Inc., and EMAX Laboratories) Project Chemist, SES-TECH Data Validator (Laboratory Data Consultants)
Electronic data deliverables	All EDDs will be verified by the laboratory performing the work for completeness and technical accuracy prior to submittal. All received EDDs will be verified against the hardcopy laboratory data packages.	External Internal	Project Chemist, SES-TECH Laboratory (Environmental Analytical Services, Inc., and EMAX Laboratories)

SAP Worksheet #35 – Validation (Step IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	Communication	Establish that required communication procedures were followed by field or laboratory personnel.	Project Manager (SES-TECH) QC Manager (SES-TECH)
IIa	Sampling Methods and Procedures	Establish that the required sampling methods were used and that any deviations were noted. Verify that the sampling procedures and field measurements met performance criteria and that any deviations were documented.	QC Manager (SES-TECH)
IIa	Holding Times	Verify that samples were analyzed within holding times specified in method, procedure, or contract requirements. If holding times were not met, confirm that deviations were documented, that appropriate notifications were made to the laboratory.	Analyst-primary, supervisor or peer-secondary (Environmental Analytical Services, Inc., and EMAX Laboratories)
IIa	Analytes	Verify that required lists of analytes were reported as specified in the SAP.	Analyst-primary, supervisor or peer-secondary (Environmental Analytical Services, Inc., and EMAX Laboratories)
IIa	Analytical Methods and Procedures	Verify that the required analytical methods were used and that any deviations were noted. Verify that the QC samples met performance criteria and that any deviations were documented.	Analyst-primary, supervisor or peer-secondary(Environmental Analytical Services, Inc., and EMAX Laboratories)
IIa	Data Qualifiers	Verify that the laboratory data qualifiers were defined in the laboratory data package and applied as specified.	Analyst-primary, supervisor or peer-secondary (Environmental Analytical Services, Inc., and EMAX Laboratories) Project Chemist (SES-TECH)
IIb	Sampling Plan	Determine whether the sampling plan was executed as specified (i.e., the number, location, and type of field samples were collected and analyzed as specified in the SAP).	Project Chemist (SES-TECH)
IIb	Sampling Procedures	Evaluate whether sampling procedures were followed with respect to equipment and proper sampling support (e.g., techniques, equipment, decontamination, volume, temperature, preservative, etc.).	Project Chemist (SES-TECH)
IIa/IIb	Field Duplicates	Compare results of field duplicates with criteria established in the SAP.	Project Chemist (SES-TECH) Data Validator (Laboratory Data Consultants)
IIa/IIb	Project	Determine that quantitation limits were achieved, as outlined in the SAP.	Project Chemist (SES-TECH)

SAP Worksheet #30 – Analytical Services Table (Continued)

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
	Quantitation Limits		Data Validator (Laboratory Data Consultants)
IIa/IIb	Performance Criteria	Evaluate QC data against performance criteria in the SAP.	Data Validator (Laboratory Data Consultants)

SAP Worksheet #36 – Analytical Data Validation (Steps IIa and IIb) Summary Table

Step IIa / IIb	Matrix	Analytical Group	Validation Criteria	Data Validator (title and organizational affiliation)
IIa/IIb	Soil gas	ASTM D-1946	In accordance with LDC, Inc. SOPs , NAVFAC SW EWI#1, and EPA Level III and IV guidelines	Laboratory Data Consultants, Inc.
IIa/IIb	Groundwater	RSK-175	In accordance with LDC, Inc. SOPs , NAVFAC SW EWI#1, and EPA Level III and IV guidelines	Laboratory Data Consultants, Inc.

SAP Worksheet #37 – Usability Assessment

The data usability assessment will be performed by a team of personnel at SES-TECH. Analytical DQOs will be assessed through application of precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters to ensure that the data of sufficient quality to meet the project objectives. The following subsections describe each of the PARCC parameters and how they will be assessed within this project.

Precision

Precision is the degree of mutual agreement between individual measurements of the same property under similar conditions. Usually, combined field and laboratory precision is evaluated by collecting and analyzing field duplicates and then calculating the variance between the samples, typically as an RPD.

$$RPD = \frac{|A - B|}{\frac{(A + B)}{2}} \text{ X } 100\%$$

Where:

A = First duplicate concentration
B = Second duplicate concentration

Field sampling precision is evaluated by analyzing field duplicate samples. Field duplicates will be collected and analyzed at a frequency of 10 percent for groundwater and vapor samples.

Laboratory analytical precision is evaluated by analyzing laboratory duplicates or matrix spikes (MS) and matrix spike duplicates (MSD). MS/MSD samples will be generated for all analytes for this project. The results of the analysis of each MS/MSD pair will be used to calculate an RPD for evaluating precision

SAP Worksheet #37 – Usability Assessment (Continued)

Accuracy

Field accuracy will be assessed by collecting and analyzing equipment rinsate, trip blank, and source water blank QC samples as appropriate. These QC samples will be used to evaluate the potential for target analytes to enter samples as a result of sampling processes.

A program of sample spiking will be conducted to evaluate laboratory accuracy. This program includes analysis of the MS and MSD samples, laboratory control samples (LCSs) or blank spikes, surrogate standards, and method blanks. MS and MSD samples will be prepared and analyzed at a frequency of 5 percent for groundwater samples. LCS or blank spikes are also analyzed at a frequency of 5 percent. Surrogate standards, where applicable, are added to every sample analyzed for organic constituents. The results of the spiked samples are used to calculate the percent recovery for evaluating accuracy.

$$\text{Percent Recovery} = \frac{S - C}{T} \times 100$$

Where:

S = Measured spike sample concentration
C = Sample concentration
T = True or actual concentration of the spike

Results that fall outside the accuracy goals will be further evaluated based on the results of other QC samples.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter at a sampling point, or an environmental condition that they are intended to represent. Representative data will be obtained for this project through careful selection of sampling locations and analytical parameters. Representative data will also be obtained through proper collection and handling of samples to avoid interference and minimize contamination.

Representativeness of data will also be ensured through the consistent application of established field and laboratory procedures. Field blanks (if appropriate) and laboratory blank samples will be evaluated for the presence of contaminants to aid in evaluating the

SAP Worksheet #37 – Usability Assessment (Continued)

representativeness of sample results. Data determined to be nonrepresentative, by comparison with existing data, will be used only if accompanied by appropriate qualifiers and limits of uncertainty.

Completeness

Completeness is a measure of the percentage of project-specific data that are valid. Valid data are obtained when samples are collected and analyzed in accordance with QC procedures outlined in this SAP, and when none of the QC criteria that affect data usability is exceeded. When all data validation is completed, the percent completeness value will be calculated by dividing the number of usable sample results by the total number of sample results planned for this investigation.

Completeness will also be evaluated as part of the data quality assessment process. This evaluation will help determine whether any limitations are associated with the decisions to be made based on the data collected.

Comparability

Comparability expresses the confidence with which one data set can be compared with another. Comparability of data will be achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data.

SAP Worksheet #37 – Usability Assessment (Continued)

Detection and Quantitation Limits

The method detection limit is the minimum concentration of an analyte that can be reliably distinguished from background noise for a specific analytical method. The quantitation limit represents the lowest concentration of an analyte that can be accurately and reproducibly quantified in a sample matrix. The quantitation limits are typically several times the method detection limit to allow for matrix effects. Analytical methods for this project have been selected so that the quantitation limits for each target analyte are below the project action limits listed in Worksheet #15, wherever practical.

Data Quality Assessment

After data are validated, the project chemist will review and assess field and laboratory quality control. The PARCC parameters will be determined as described above. Data validation reports will be reviewed and assessed for meeting DQOs. The project chemist will review the data validation reports for any deviations and qualify data. The following data qualifiers will be used:

J – Result is estimated

U – Analyte is not detected at or above the stated QL

R – Data are rejected

UJ – Analyte is not detected, but there is an uncertainty about the QL

Data qualifiers are used to indicate uncertainties associated with the data. The assigned qualifiers will be entered into the validation code field in the database. In addition, data will be assessed through the evaluation of the PARCC parameters.

The project chemist will prepare a data quality assessment report that will summarize the findings of the data assessment and discuss the usability of the data to be included in the report.

Data will be reported in tabular format to be included in the report. The electronic data in NEDD format will be submitted to the Naval Installation Restoration Information Solution (NIRIS) database within 30 days of completion of validation, as described in *EWI EVR.6, Environmental Data Management and Required Electronic Delivery Standards* (SWDIV 2005). An e-mail confirmation received by SES-TECH will be forwarded to the project file.

REFERENCES

DoD (Department of Defense). 2006. *Quality Systems Manual for Environmental Laboratories*. Version 3. January.

EPA (U.S. Environmental Protection Agency). 1999. *National Functional Guidelines for Organic Data Review, EPA 540/R-99/008*. Contract Laboratory Program. October.

————. 2002. EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS. December.

————. 2004. *National Functional Guidelines for Inorganic Data Review, EPA 540/R-04/004*. Contract Laboratory Program. October.

————. 2005. *Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP)*. March.

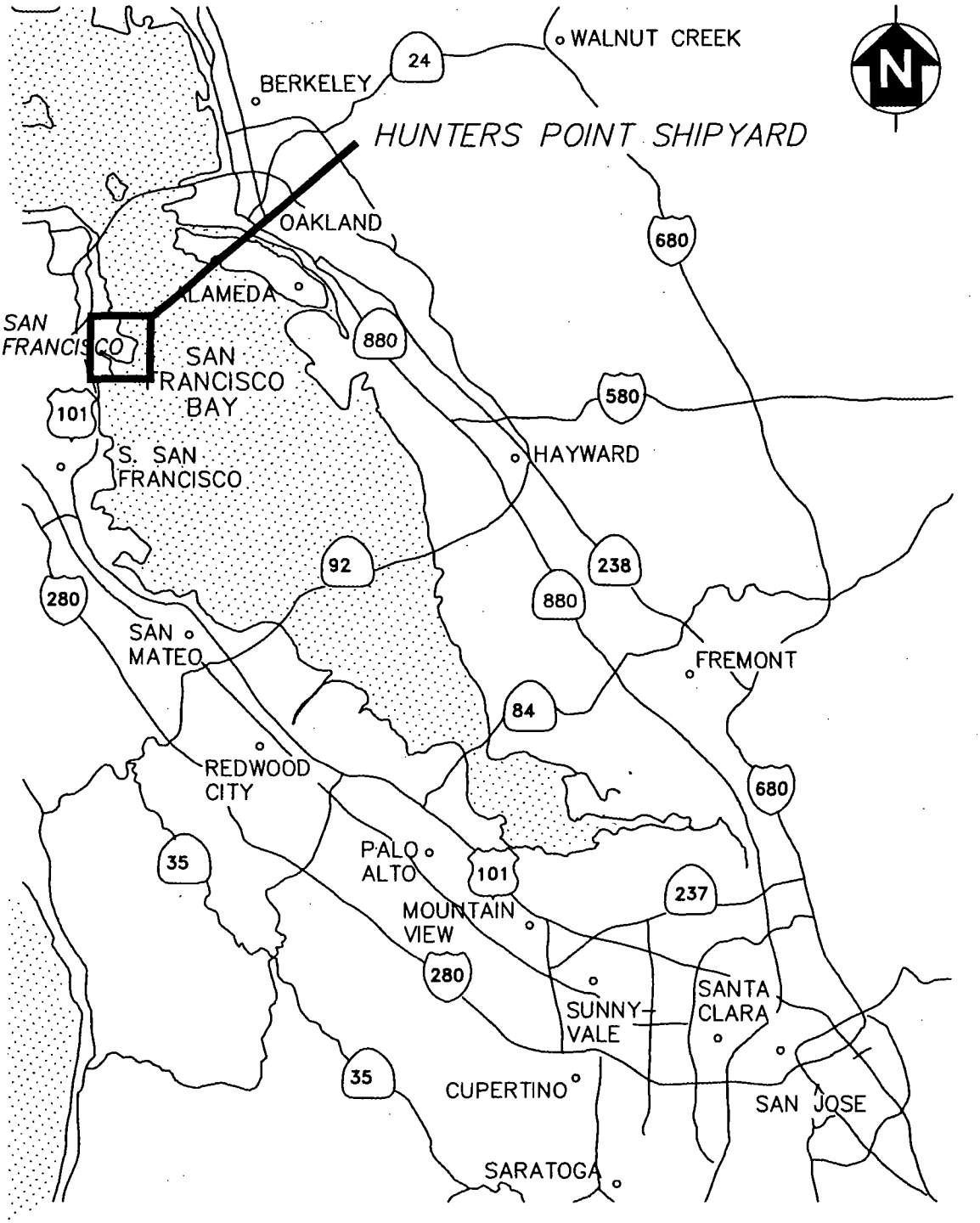
NAVSEA (Naval Sea Systems Command). 2004. *Final Historical Radiological Assessment, Volume II*. August 31.

SWDIV (Southwest Division Naval Facilities Engineering Command). 2001. *Environmental Work Instruction (EWI) #1, 3EN2.1, Chemical Data Validation*. November.

————. 2005. *Environmental Work Instruction (EWI) EVR.6, Environmental Data Management and Required Electronic Delivery Standards.*

FIGURES

DRAWN BY: MD	CHECKED BY: RA	APPROVED BY: RA	DCN: SEST-3220-0002-0017	DRAWING NO: 0001A1.DWG
DATE: 08/2008	REV:		CTO: 0002	



NOT TO SCALE

Figure 1
LOCATION MAP

FINAL SAMPLING AND ANALYSIS PLAN
HUNTERS POINT SHIPYARD, PARCEL B
METHANE SOURCE AREA
TIME-CRITICAL REMOVAL ACTION

SES-TECH

DRAWN BY: MD	DRAWING NO: 0001A2.DWG
DATE: 08/2008	DCN: SEST-3220-0002-0017
CHECKED BY:	CTO: 0002
REV:	
APPROVED BY: RA	

LEGEND

- NAVY PROPERTY BOUNDARY
- PARCEL BOUNDARY
- IR INSTALLATION RESTORATION
- B PARCEL LETTER

N

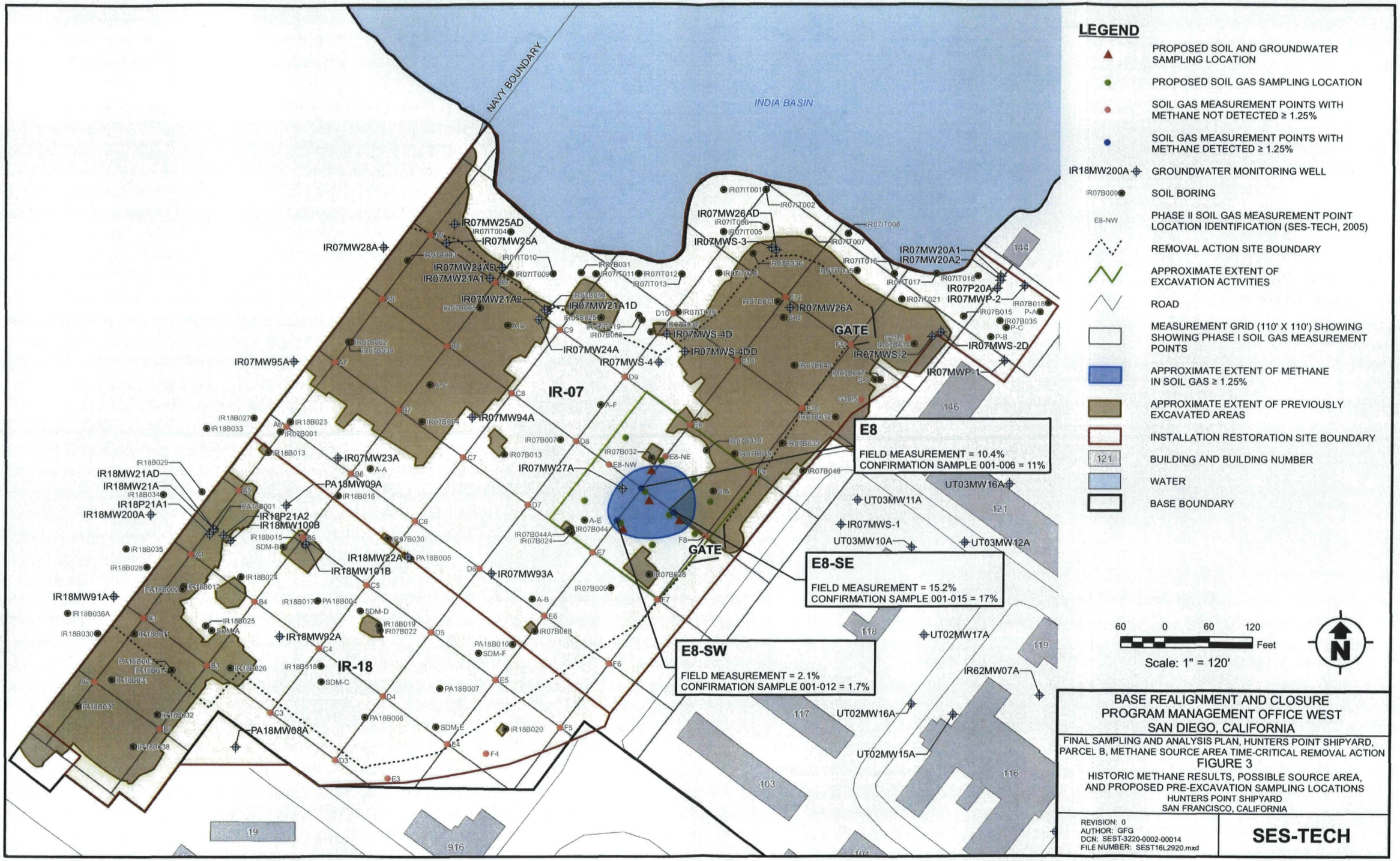
400' 0 400' 800'

SCALE: 1" = 800'

Figure 2
SITE MAP

FINAL SAMPLING AND ANALYSIS PLAN
HUNTERS POINT SHIPYARD, PARCEL B
METHANE SOURCE AREA
TIME-CRITICAL REMOVAL ACTION

SES-TECH



LEGEND

- PROPOSED SOIL AND GROUNDWATER SAMPLING LOCATION
- PROPOSED SOIL GAS SAMPLING LOCATION
- SOIL GAS MEASUREMENT POINTS WITH METHANE NOT DETECTED ≥ 1.25%
- SOIL GAS MEASUREMENT POINTS WITH METHANE DETECTED ≥ 1.25%
- IR18MW200A — GROUNDWATER MONITORING WELL
- IR07B009 — SOIL BORING
- E8-NW — PHASE II SOIL GAS MEASUREMENT POINT LOCATION IDENTIFICATION (SES-TECH, 2005)
- REMOVAL ACTION SITE BOUNDARY
- APPROXIMATE EXTENT OF EXCAVATION ACTIVITIES
- ROAD
- MEASUREMENT GRID (110' X 110') SHOWING SHOWING PHASE I SOIL GAS MEASUREMENT POINTS
- APPROXIMATE EXTENT OF METHANE IN SOIL GAS ≥ 1.25%
- APPROXIMATE EXTENT OF PREVIOUSLY EXCAVATED AREAS
- INSTALLATION RESTORATION SITE BOUNDARY
- 121 — BUILDING AND BUILDING NUMBER
- WATER
- BASE BOUNDARY

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL SAMPLING AND ANALYSIS PLAN, HUNTERS POINT SHIPYARD, PARCEL B, METHANE SOURCE AREA TIME-CRITICAL REMOVAL ACTION

FIGURE 3

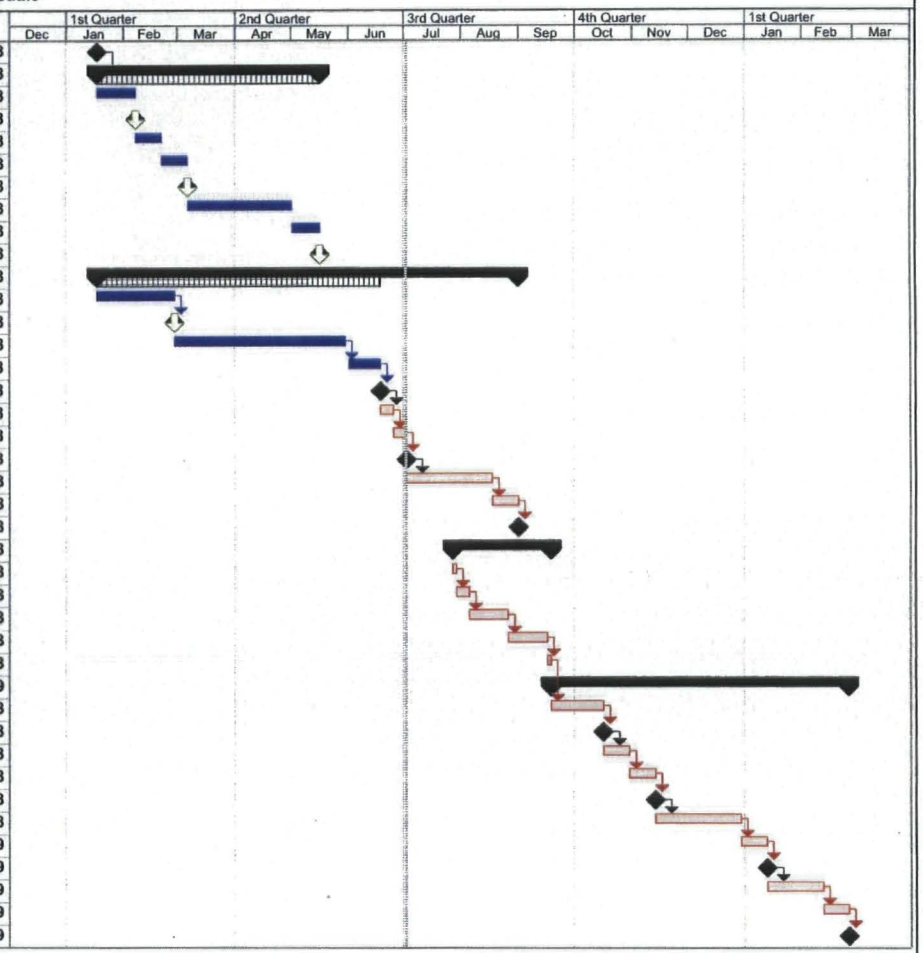
HISTORIC METHANE RESULTS, POSSIBLE SOURCE AREA, AND PROPOSED PRE-EXCAVATION SAMPLING LOCATIONS
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: SEST-3220-0002-00014
FILE NUMBER: SEST16L2920.mxd

SES-TECH

Figure 4
Project Schedule

ID	Task Name	Duration	Start	Finish
1	Notice to Proceed	0 days	Fri 1/18/08	Fri 1/18/08
2	Action Memorandum	86 days	Fri 1/18/08	Fri 5/16/08
3	Prepare Pre-Draft Action Memorandum	3 wks	Fri 1/18/08	Thu 2/7/08
4	Submit Pre-Draft Action Memorandum	0 wks	Thu 2/7/08	Thu 2/7/08
5	Internal Navy review	2 wks	Fri 2/8/08	Thu 2/21/08
6	Prepare RTCs and revised text	2 wks	Fri 2/22/08	Thu 3/6/08
7	Submit Draft Action Memorandum	0 days	Thu 3/6/08	Thu 3/6/08
8	Regulatory review	8 wks	Fri 3/7/08	Thu 5/1/08
9	Prepare RTCs and Final Action Memorandum (No Draft Final)	2.2 wks	Fri 5/2/08	Fri 5/16/08
10	Submit Final Action Memorandum	0 wks	Fri 5/16/08	Fri 5/16/08
11	Planning Documents	161.5 days	Fri 1/18/08	Mon 9/1/08
12	Prepare Internal Draft Planning Documents	6 wks	Fri 1/18/08	Thu 2/28/08
13	Submit Internal Draft Planning Documents	0 wks	Thu 2/28/08	Thu 2/28/08
14	Internal Navy review	13.2 wks	Fri 2/29/08	Fri 5/30/08
15	Prepare Revised Internal Draft Planning Documents	2.6 wks	Mon 6/2/08	Wed 6/18/08
16	Submit Internal Draft Planning Documents for Navy review	0 days	Wed 6/18/08	Wed 6/18/08
17	Navy review	5 days	Thu 6/19/08	Wed 6/25/08
18	Prepare RTCs and Draft Planning Documents	5 days	Thu 6/26/08	Wed 7/2/08
19	Submit Draft Planning Documents	0 days	Wed 7/2/08	Wed 7/2/08
20	Regulatory review	6.5 wks	Thu 7/3/08	Mon 8/18/08
21	Prepare RTCs and Final Planning Documents	2 wks	Mon 8/18/08	Mon 9/1/08
22	Submit Final Planning Documents	0 days	Mon 9/1/08	Mon 9/1/08
23	Field Work	39 days	Mon 7/28/08	Thu 9/18/08
24	Mobilization	2 days	Mon 7/28/08	Tue 7/29/08
25	Perform pre-excavation characterization	1 wk	Wed 7/30/08	Tue 8/5/08
26	Perform excavation and radiological screening (0 ft - 15 ft)	3 wks	Wed 8/6/08	Tue 8/26/08
27	Perform excavation and radiological screening (15 ft - 25 ft) *conti	3 wks	Wed 8/27/08	Tue 9/16/08
28	Site restoration	2 days	Wed 9/17/08	Thu 9/18/08
29	Closeout Report	115 days	Fri 9/19/08	Thu 2/26/09
30	Prepare Pre-Draft Closeout Report	4 wks	Fri 9/19/08	Thu 10/16/08
31	Submit Pre-Draft Closeout Report	0 days	Thu 10/16/08	Thu 10/16/08
32	Internal Navy review	2 wks	Fri 10/17/08	Thu 10/30/08
33	Prepare RTCs and revised text	2 wks	Fri 10/31/08	Thu 11/13/08
34	Submit Draft Closeout Report	0 days	Thu 11/13/08	Thu 11/13/08
35	Regulatory review	6.5 wks	Fri 11/14/08	Tue 12/30/08
36	Prepare RTCs and Draft Final Closeout Report	2 wks	Tue 12/30/08	Tue 1/13/09
37	Submit Draft Final Closeout Report	0 days	Tue 1/13/09	Tue 1/13/09
38	Regulatory review	4.5 wks	Tue 1/13/09	Thu 2/12/09
39	Prepare RTCs and Final Closeout Report	2 wks	Fri 2/13/09	Thu 2/26/09
40	Submit Final Closeout Report	0 days	Thu 2/26/09	Thu 2/26/09



CTO 2 Schedule_062508.mpp
Wed 7/2/08

Critical
Critical Split
Critical Progress
Task
Split
Task Progress
Baseline
Baseline Split
Baseline Milestone
Milestone
Summary Progress
Summary
Project Summary
External Tasks
External Milestone
Deadline

APPENDIX B

RADIOLOGICAL SUPPORT WORK INSTRUCTION

IR-07 Methane Removal Radiological Support Work Instruction
Prepared by Tetra Tech EC
Revision 0
August 18th, 2008

SES-TECH is performing a time-critical removal action (TCRA) at Installation Restoration Site 07 (IR-07) located within Parcel B at Hunters Point Shipyard, San Francisco, California. The primary objective of the TCRA is to remove methane in soil gas and its source material from IR-07 to eliminate threats to public welfare now and in the future. Visually contaminated soil and soil or debris identified as potential methane-producing material will be disposed of off-site. These activities will ensure the methane in soil gas is removed, thereby eliminating the current threat. Removing the methane source material will eliminate future threats due to generation of methane gas.

IR-07 has been designated as a radiologically impacted site and, consequently, it is possible that portions of IR-07 are contaminated. The radionuclides of concern are radium-226, cesium-137, strontium-90, and plutonium-239. Previous surveys have been conducted in limited areas at IR-07. Sandblast grit was encountered and sampled at one location, the results of which identified elevated levels of naturally occurring radioactivity.

Basic radiation safety survey protocols will be implemented during the work SES-TECH will perform in this area. The work activities SES-TECH will perform include:

- Review historical and current information related to the removal action area.
- Collect and analyze soil gas samples to confirm methane levels in soil gas.
- Collect and analyze soil and groundwater samples to help evaluate the nature and extent of the methane source area.
- Excavate the methane source area.
- Segregate visually contaminated soil and methane source material.
- Create individual soil stockpiles for radiological and chemical waste characterization.
- Coordinate with other Navy contractors responsible for waste characterization, off-site disposal, and transportation.
- Coordinate with other Navy contractors responsible for radiological sampling, control, and surveying activities.
- Backfill the excavation.
- Install soil gas monitoring probes and perform initial monitoring to confirm methane in soil gas has been removed.
- Restore the site to match existing conditions.
- Prepare a Removal Action Closeout Report that documents the field methods, analytical results, data evaluation, conclusions, and recommendations.

TtEC will provide basic radiation protocols during this work by:

- Providing a radiation safety briefing to SES-TECH staff assigned to the project.
- Performing incoming equipment and material surveys.
- Providing radiological monitoring of each planned direct-push technology (DPT) sampling location.
- Performing radiological surveys of equipment and materials prior to decontamination of equipment and materials.
- Performing a scan of the excavated soils (ex situ material).
- Performing radiological surveys of equipment and materials prior to decontamination of equipment and materials.

- Performing personnel surveys while the work is being performed.
- Performing radiological release surveys on outgoing equipment and material at the conclusion of the project.

The survey activities performed under this work instruction will be conducted in accordance with the general approach and methodologies that are given in the Base-wide Radiological Work Plan Revision 1 (Base-wide Plan), and associated Standard Operating Procedures (SOPs). The survey activities will conform to the requirements of the Base-wide Health and Safety Plan and the Building-specific Health and Safety Plan prepared for the site.

Reference area surveys will be performed in the same area utilized for the former Building 114 and 142 Sites (behind Building 116). This area has similar physical, chemical, radiological, and biological characteristics as the impacted soil being investigated, but has not been identified as radiologically impacted by the Historical Radiological Assessment. The background radioactivity measured in the reference area will be compared to field survey/sample data collected during surveys. Additional reference areas will be selected on a case-by-case basis in consultation with the Radiological Affairs Support Office (RASO).

Incoming equipment and materials will be surveyed for radioactivity prior to being placed into service on the jobsite. Surveys will be conducted in accordance with SOP HPO-Tt-006, *Radiation and Contamination Surveys.*

Radiological surface scans will be conducted in the excavation area boundary and proposed work areas to establish baseline radiation levels for the development of a Radiation Work Permit (RWP). If elevated gamma radiation readings (twice the background value identified at a reference area to be selected in consultation with the RASO) are detected during the scan survey, SES-TECH will be advised of the existing conditions and the RASO will be notified.

Surveys of tools, materials, and equipment will be conducted in accordance with SOP HPO-Tt-006, *Radiation and Contamination Surveys*. Surveys of tools, materials, and equipment will be completed prior to any chemical decontamination method being used to minimize generation of radiological waste streams. Direct push technology (DPT) equipment used to collect core samples will be surveyed after each core is collected and the DPT equipment has been removed from the ground, prior to chemical decontamination. Once chemical decontamination has been completed, the sampling equipment will be resurveyed to ensure the equipment is free from radioactive contamination. If radioactive contamination is identified that is above the release criteria in Table 1, decontamination will be performed in accordance with SOP HPO-Tt-016, *Decontamination of Tools and Equipment.*

Screening of excavated soils will occur as outlined below:

1. The spoils of excavation activities will be transported by truckload to a pre-designated screening area. Prior to bringing the soil from the excavation to a screening area, ambient background radiation readings will be collected in accordance with SOP HPO-Tt-007, *Preparation of Portable Radiation and Contamination Survey Meters*. For screening, the soil will be spread out into a lift with a maximum thickness of 6 inches.

2. Walk-over scan surveys of the spread-out soil will be performed with 2" x 2" sodium iodide detectors for gamma radiation (per SOP HPO-Tt-006). If elevated gamma radiation readings (three sigma above the background values) are detected during the scan survey, and subsequent investigations identify radioactive contamination to be present, the RASO will be contacted and modifications to the RWP and work practices may be implemented.

    a. Soils that exhibit elevated readings will be remediated, sampled and placed into an appropriate waste container for future characterization. Excavation activities and radiological screening at the screening pads will be coordinated to assure that timely modification to the work practices at the excavation are implemented in the event that significant contamination levels are detected on the pad.

    b. If no elevated gamma measurements are identified during the scan survey, the soil may either be removed & consolidated for subsequent backfill, or additional soil may be placed above the materials for additional screening under item 1 above.

3. Remedial actions, if necessary, will occur to remove any contaminated soils. Soils will be removed in to within 1 foot of the contamination laterally, and to a depth of 12 inches below the existing surface of the lift or to the maximum depth associated with the screening pad surface, whichever occurs first. Scans will be performed to confirm the effectiveness of the remedial action. Wastes will be sampled for isotopic identification.

4. After remedial actions are completed, the soil may either be removed & consolidated for subsequent backfill, or additional soil may be placed above the previously screened soils for additional screening under item 1 above, after the pad has been sufficiently adjusted to a nominal grade across the entirety of the area to be scanned.

If sandblast grit is encountered during the excavation, it will be segregated and stockpiled separately. Once stockpiled, sandblast grit will be surveyed and sampled in accordance with the TtFW HPS Sandblast Grit Work Instruction.

Surveys of tools, materials, and equipment will be conducted in accordance with SOP HPO-Tt-006, *Radiation and Contamination Surveys*. Surveys of tools, materials, and equipment will be completed prior to any chemical decontamination method being used to minimize generation of radiological waste streams. If radioactive contamination is identified that is above the release criteria in Table 1, decontamination will be performed in accordance with SOP HPO-Tt-016, *Decontamination of Tools and Equipment*.

TABLE 1

MATERIALS AND EQUIPMENT RELEASE CRITERIA

Radionuclide	Radiation	Half-life (years)	Surfaces[a] (dpm/100 cm^2)	
			Loose	Total
Cesium-137 (^{137}Cs)	Beta, gamma	30.1	1,000	5,000
Plutonium-239 (^{239}Pu)	Alpha, gamma	2.41×10^4	20	100
Radium-226 (^{226}Ra)	Alpha, gamma	1,599	20	100
Strontium-90 (^{90}Sr)	Beta	28.78	200	1,000

Notes:

[a] Both Loose and Total limits are based on AEC *Regulatory Guide 1.86*. Limits for removable surface activity are 20 percent of these values, and are also indicated.

[b] These limits are adopted from the *Final Basewide Radiological Removal Action Action Memorandum – Revision 2006*.

Work will be performed in accordance with the requirements of a TtEC site specific RWP. If elevated levels of radioactivity are identified during the performance of the work, a modification to the RWP will be issued.

To minimize potential worker exposure to contamination during excavation, screening, and stockpiling, air monitoring for radiological constituents will be performed using TtFW's SOP HPO-Tt-008, Air Sampling and Analysis. In order to control occupational exposures, establish PPE, and determine respiratory protection requirements, monitoring and trending for airborne radioactive material will be performed as necessary. Engineering controls, with concurrence from the RASO, will be implemented if required to maintain airborne concentrations below 10 percent of the applicable derived airborne concentration (DAC) value for the ROCs, as identified in Table 2.

If, during the course of work, an airborne concentration exceeds 10 percent of the DAC, ongoing activities will cease and the affected location will be posted until the source of the airborne concentration is eliminated and levels are confirmed to be below 10 percent of the DAC.

TABLE 2

DERIVED AIR CONCENTRATION

Radionuclide	Worker	
	DAC (µCi/mL)	10% DAC (µCi/mL)
Radium (Ra)-226	3.0E-10	3.0E-11
Plutonium (Pu)-239	3.0E-12	3.0E-13
Strontium (Sr)-90	2.0E-9	2.0E-10
Cesium (Cs)-137	6.0E-8	6.0E-9

Notes:

The above guideline values were determined using the NRC's 10 CFR, Part 20, Appendix B.

µCi/mL – microcuries per milliliter (activity)
CFR – Code of Federal Regulations
DAC – derived airborne concentration
NRC – Nuclear Regulatory Commission

Outgoing equipment and materials (including surveys of removed temporary sampling probe materials) will be surveyed for release prior to leaving the jobsite. Surveys will be conducted in accordance with SOP HPO-Tt-006, *Radiation and Contamination Surveys*. Wipe samples will be collected from the tools and equipment prior to leaving the site. If radioactive contamination is identified that is above the release criteria in Table 1, decontamination will be performed in accordance with SOP HPO-Tt-016, *Decontamination of Tools and Equipment.*

Results of the surveys will be submitted to the RASO upon completion of the surveys and compilation of the survey data. A general statement that screening was performed and what the screening showed without actually listing the screening data will be included in the Removal Action Closeout Report. The screening data will be provided to RASO and documented for future reference if required.

If generated, radioactive waste or equipment and materials having contamination present that exceeds the criteria identified in Table 1 that could not be decontaminated will be packaged and placed in Building 406. The waste will be maintained under New World Technology, Inc.'s license until disposed of via the Department of the Navy Low-level Radioactive Waste Disposal Program.

APPENDIX C

RESPONSE TO COMMENTS

RESPONSES TO INTERIM REGULATORY REVIEW COMMENTS DISCUSSED VIA CONFERENCE CALL

JULY 15, 2008
HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

Conference call attendees: Mark Ripperda (EPA), Tom Lanphar (DTSC), Erich Simon (RWQCB), Lara Urizar (Navy), Melanie Kito (Navy), Sarah Penn (Navy), and Ryan Ahlersmeyer (SES-TECH)

GENERAL COMMENTS	RESPONSE
RWQCB **Comment 1.** Observation that the excavation will largely be under water, and call attendees were generally interested in the basic approach and controls for executing the work without dewatering. Requested further discussion on dewatering practices.	**Response 1.** Team discussed the possible engineering controls to be put in place during field work. These include the use of a competent person overseeing the excavation, use of dewatering pads, and overall material handling practices used in previous excavations at Hunters Point and other sites.
RWQCB and EPA **Comment 2.** Similar to #1, participants wanted to discuss the use of vertical walls during excavation rather than shoring and/or sloping.	**Response 2.** See above. In addition, the excavation may be backfilled as it progresses in an effort to "crowd" the adjacent walls and prevent sidewall collapse. Best engineering practices will be employed.
SPECIFIC COMMENTS	**RESPONSES**
RWQCB and EPA **Comment 1.** Request to collect confirmatory soil gas samples for laboratory analysis at locations with lowest concentration or ND, not just the high concentrations.	**Response 1.** Work plan to be modified to collect confirmatory samples (via laboratory analysis) at 100% of the locations. Confirmation samples will be analyzed on a 48-hour turn around time.
RWQCB **Comment 2.** Preferential pathways	**Response 2.** Field engineers and other personnel will be documenting the progression of the excavation. Specifically, they will be noting type and quantity of material, potential waste (chemical and radiological) classifications, depth and extent of the hole, and looking for conduits or other pathways which may influence past and future gas migration.

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RWQCB **Comment 3.** Contingencies if we don't find methane-producing material.	**Response 3.** If methane-producing material is not identified during excavation, then the excavation will be limited to the approximate extent of methane in soil gas as shown on Figure 2-1 of the work plan. The excavation will be extended vertically until native material is encountered.
DTSC **Comment 4.** Excavation boundary definition.	**Response 4.** Work plan currently states that the excavation boundary will be finalized prior to excavation commencing. Text will be adjusted to state that the "initial excavation boundary will be determined by the preliminary sampling, while the final boundary will depend on type, quantity, and location of material encountered in the hole."
RWQCB and DTSC **Comment 5.** Time period for post-TCRA soil gas stabilization. Planned sampling post-TCRA. Continual monitoring post-excavation.	**Response 5.** Five permanent probes will be installed post-TCRA and sampled once as part of this TCRA. Subsequent sampling is TBD; most likely during the RD.
RWQCB and EPA **Comment 6.** Radiological screening during TCRA	**Response 6.** Radiological screening for the purpose of worker safety and disposal will be conducted.
DTSC **Comment 7.** Purging of soil gas probes during sampling. IWMB guidance recommends initial head space reading, and monitor the probe until steady state measurements are achieved for at least 30 seconds.	**Response 7.** IWMB guidance to be incorporated in sampling procedure to the extent practicable, including an initial headspace measurement followed by subsequent purging and sampling.

RESPONSE TO COMMENTS TO
DRAFT TIME CRITICAL REMOVAL ACTON WORK PLAN
FOR THE METHANE SOURCE REMOVAL AT IR-07
HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA
(DATED JULY 1, 2008)

Reviewed by Thomas P. Lanphar, Senior Hazardous Substance Scientist
Department of Toxic Substances Control
Comments Dated: July 21, 2008

SPECIFIC COMMENTS	RESPONSES
Comment 1. Page 2-1, Section 2.1 Site Description and History Aerial photographs from 1935, 1948, 1955, and 1963 are discussed in this section. Attachment 3 includes aerial photos; however the 1935 and 1963 photographs are not included. Please include these photographs in attachment 3.	**Response 1.** The photographs included in the draft work plan were selected to support the rationale and logic behind potential source material in the area of investigation. Additional photographs from 1961, 1963, 1969, and 1972 are available and have been included in the final version of the work plan. Photographs from 1935 exist only as stereo pairs, and are therefore not included in this update.
Comment 2. Page 2-1, Section 2.1.1 Installation Restoration Site 07/18. The text identifies a sandblast grit disposal area. Was the sandblast disposal area excavated during remedial earlier remedial activities?	**Response 2.** The referenced area was included based on historical research and document review during the Preliminary Assessment phase of investigation. Some limited amounts of sandblast grit were encountered during the remedial action excavations conducted at IR-07, however the locations encountered do not constitute a distinct sandblast grit disposal area.
Comment 3.. Page 2-2, Section 2.1.1 Installation Restoration Site 07/18 According to the text, over 100,000 cubic yards of contaminated soil was removed; however, the text is not clear if this soil was removed from Sites 7, Site 18, both of these sites, or from Parcel B as a whole. Please clarify.	**Response 3.** The quantity of soil removed is in reference to all of Parcel B, including IR-07. The text has been revised to clarify that the quantity is representative of the entire Parcel.

RESPONSE TO COMMENTS TO DRAFT TIME CRITICAL REMOVAL ACTON WORK PLAN FOR THE METHANE SOURCE REMOVAL AT IR-07 HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA (DATED JULY 1, 2008)	
Reviewed by Thomas P. Lanphar, Senior Hazardous Substance Scientist Department of Toxic Substances Control Comments Dated: July 21, 2008	
Comment 4. Page 3-4, Section 3.3.2 Soil Gas Measurement Guidance of the California Integrated Waste Management Board for measurement of methane gas in monitoring probes recommends that probes not be purged prior to sampling. Instead, gas readings are taken on un-purged probes and sampled until a steady state is established. With this method and initial the head space gas measurement can be collected and recorded followed by a gas measurement that is indicative of soil gas concentrations. The CIWMB guidance can be accessed at http://www.ciwmb.ca.gov/leacentral/landfillgas/monitoring/screening/.	**Response 4.** The associated guidance has been incorporated as the guidance for soil gas sampling, to the extent practicable.
Comment 5. Page 3-5, Section 3.3.5 In Situ Soil and Groundwater Sampling In order to provide an indication of potential radioactive contamination of soil, please include on-site radiation screening of soil cores.	**Response 5.** All soil cores will be field-screened for radioactivity prior to shipment and/or offsite disposal in accordance with the existing Base Wide Radiological Work Plan prepared by Tetra Tech EC under separate contract.
Comment 6. Page 3-6, Section 3.4 Excavation and Soil Management The first sentence of this section states that the excavation boundary will be finalized based on the results from preliminary soil, soil gas, and groundwater sampling and analysis. Pre-excavation sampling is appropriate to estimate the excavation boundary; however, the final extent of the excavation should be based on the removal of methane generating waste material. Please clarify this statement.	**Response 6.** The referenced text has been revised to state that the "initial excavation boundary will be determined by the preliminary sampling, while the final boundary will depend on type, quantity, and location of material encountered in the hole."

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Reviewed by Thomas P. Lanphar, Senior Hazardous Substance Scientist Department of Toxic Substances Control Comments Dated: July 21, 2008	
Comment 7. Figure 1-2 Please include the parcel boundaries on the figure.	**Response 7.** The Parcel boundaries are included on Figure 1-2 as a black, bolded line.
Comment 8. Attachment 3 Aerial Photographs Please include the IR-7 and IR-18 boundary on the photographs and show the approximate location of the methane source removal action excavation.	**Response 8.** The IR-07 and IR-18 boundaries have been incorporated into the aerial photographs, including those added in response to DTSC comment #1

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HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA
(DATED JULY 1, 2008)

Department of Public Health Review
(no name provided in comments)
Comments Dated: July 30, 2008

GENERAL COMMENTS	RESPONSES
Comment 1: While CDPH understands that the goal of this work plan is for removal of methane sources and not for radiological site characterization, CDPH recommends that the Navy analyze additional soil samples, maybe 1 per screening pad, for radiological materials. As per conceptual site model for IR07 and IR18, there is a potential for the presence of both the discrete and dispersed sources in the fill areas and to date very few soil samples from IR 07 have been analyzed for radiological materials. Therefore, radiological analysis of additional soil samples collected from IR07 may perhaps provide a better understanding of the nature and extent of radiological contamination if any in this fill area and may perhaps support the Navy's assertion that "the proposed remedy of capping the fill area will provide adequate protection to the pubic and the environment".	**Response 1:** As part of the remedy evaluation and selection process, the Navy, in consultation with regulatory and community stakeholders, have proposed a remedy for the IR-07 and -18 sites that is both protective of human health and the environment, and in compliance with all applicable and relevant and appropriate requirements (ARARs). A primary component of the proposed remedy is a radiological surface survey, hot spot remediation to 12 inches below ground surface, followed by construction of a 2-foot engineered soil cap over the existing ground surface. Additional sampling for radiological constituents may be performed during implementation of the remedial action, and the details will be included in the appropriate remedial design planning documents. The primary objective of this removal action is to remove the source of methane gas in the subsurface. Therefore, additional soil samples for radiological analysis are not planned for the purposes of site characterization. However, radiological monitoring and control procedures are in place and are being employed during this TCRA due to the radiologically impacted status of the site. In the event that these controls and monitoring procedures indicate the

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Department of Public Health Review **(no name provided in comments)** Comments Dated: July 30, 2008	
	potential for a risk to worker safety, RASO will be notified, work will be stopped, and appropriate modifications to the screening procedures will be implemented, potentially including discrete soil sampling for isotopic analysis
Comment 2: Please provide estimates of minimum detectable levels for each survey or measurement type to be performed on the 12 inch lifts as indicated in the work plan. Also, explain how the attenuation from the thickness of the soil will be considered when calculating the minimum detectable levels for the 12 inch lifts? CDPH recommends that the Navy perform radiation scans on 6 inch lifts for a better detection of radiological materials in the fill area IR07, especially as this material will be used as a back fill	**Response 2:** The soil screening process included in the Draft version of the TCRA Work Plan has been modified to include radiological surveys of excavated material spread into a 6-inch rather than a 12-inch lift. The process has been modified to a:) provide an increased level of worker safety, and b:) support an optimization of the material handling and processing procedure.